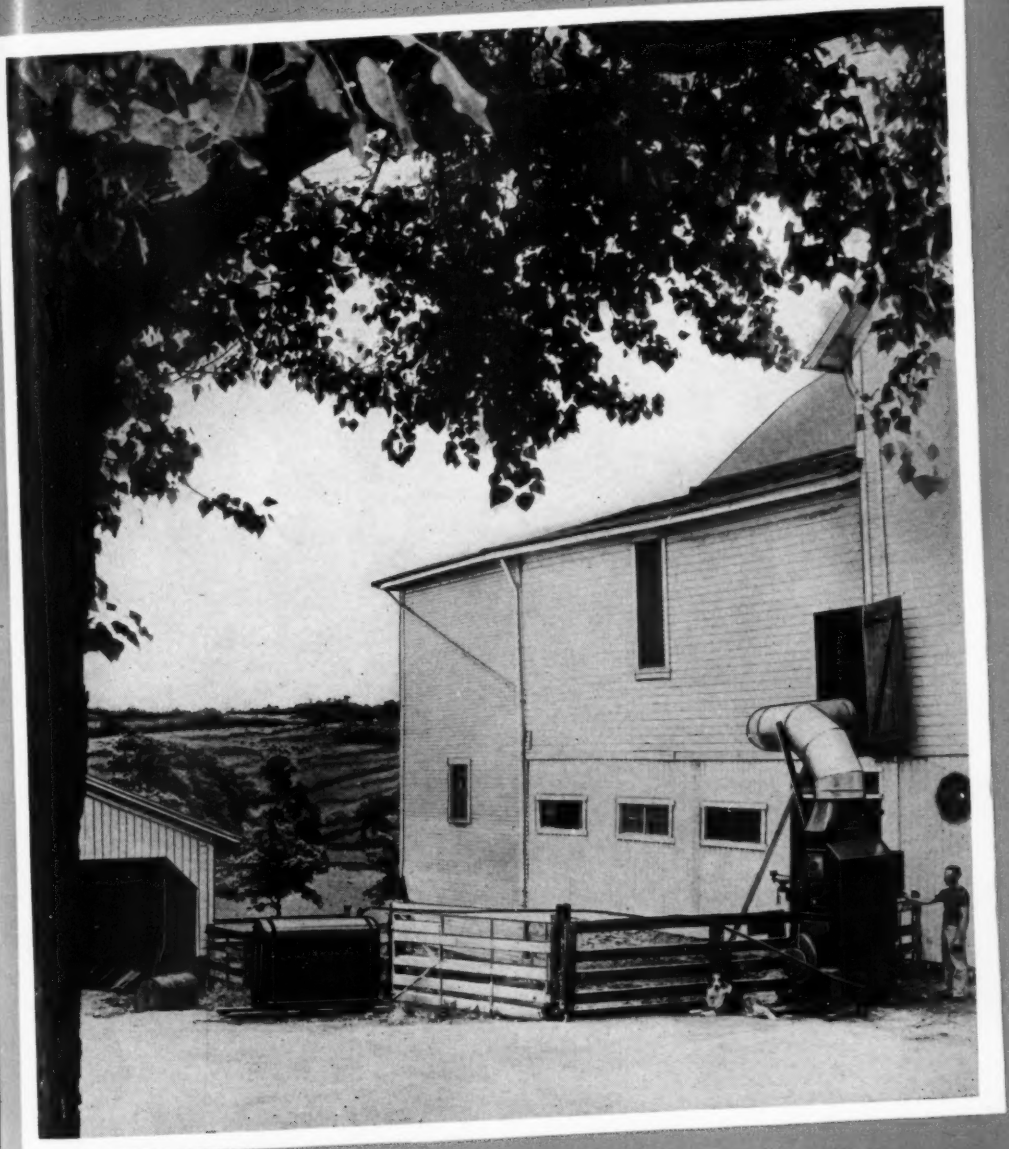
ELECTRICITY ON THE FARM *Magazine*

POLYTECHNIC INSTITUTE
URARY
CKSBURG, W. VA.

Crop Drying Comes of Age . . .
Incubator Room
Labor Lighteners . . .
4-H Frozen Food Finalists . . .
Refrigerated Meat Time-Table

24th Year . . . . . No. 4



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EQUIPPED WITH GENERAL ELECTRIC MOTOR

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GENERAL ELECTRIC

FarmNews

EQUIPPED WITH GENERAL ELECTRIC CONTROL

. . . look for these labels whenever you buy.

MORE POWER TO THE AMERICAN FARMER through more electricity on the farm

ONE MAN MILKS 40 COWS AN HOUR

WHAT MAKES IT "TICK"?

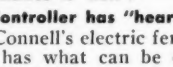
ELECTRIC FENCE CONTROLLER

Outdoor men are very often curious and Mr. John Connell (photo, below) is no exception. On Mr. Connell's Hi-View Farm in Illinois, he has an electric fence controller that keeps his herd in the proper field. The equipment is satisfactory, yet Mr. Connell is curious. He asked "what makes the fence controller 'tick'? I know it saves me money

when I shift the herd to a new location—less wire and far fewer posts to buy, no holes to dig, no help to hire. But, what makes it work? What makes it 'tick'?"

Controller has "heart"

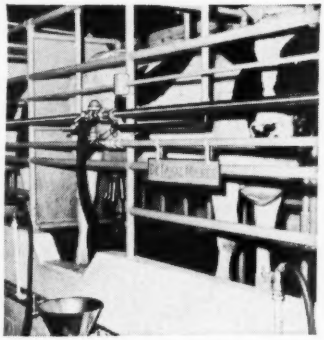
Mr. Connell's electric fence controller has what can be called a "heart," including a tiny device with a big name and a vital job. The device is called a selenium rectifier, made by General Electric. This changes alternating current (ac) to direct current (dc), so that the con-

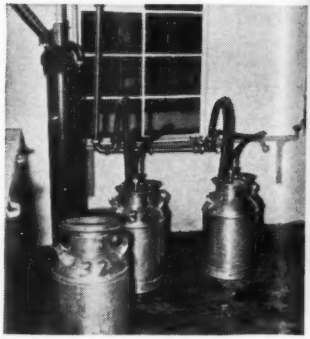


A G-E rectifier — dependable power converter.

troller will operate on a battery or on a normal a-c farm wiring system. The d-c current is then sent through the wire "fence" in the form of a sharp but safe charge that tickles cattle on contact. For more information, check "Fence Controller" in the coupon.

Milking system speeds daily routine; uses help of modern dairy cow to save time, work, manpower





The photo (above, left) shows the cow in the special milking stall with the teat cups attached. You will notice that on the stall are two pipe lines. The lower line, painted white, carries the vacuum. The upper line is the sanitary dairy pipe which carries the milk as it is drawn from the cow directly to the milk cans (above, right) in the milk house.

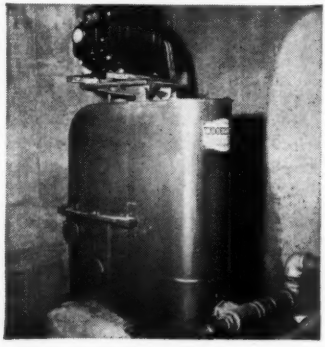
By providing complete mechanization of the milking routine, a New York State manufacturer has greatly increased the work that one man can do. Through the use of efficient equipment, assembly-line techniques, and the cow's help, this system makes the chore easier and permits a single operator to handle a sizeable herd — up to 40 cows each hour according to the manufacturer.

Steady Vacuum

The vacuum system is steady and regular with a dependable ½-hp G-E motor doing the work. From the starter switch to the milk can the system is a completely mechanized milking routine. For more information check "Milking System" on the coupon below.

VITAL WATER SUPPLY ASSURED

Mr. and Mrs. Elwyn E. Bonebright of Lena, Illinois, recently installed a second deep well pump and water system on a 142-acre dairy farm. The pump and ¾-hp G-E motor that operate the 232-foot well are pictured below. Check "Water System" in the coupon.



General Electric Company
Section D671-16B, Schenectady 5, N. Y.

I would like additional information on the following equipment:

☐ Milking System ☐ Water System
☐ Fence Controller

NAME_____

ADDRESS_____

CITY_____ STATE_____

...of course, it's electric!

Time It by Your Watch

and see the new SUPER-SPEED COROX* Unit get

Red-Hot in 30 Seconds!

Talk about speed! This fabulous new Westinghouse SUPER-SPEED COROX Unit is the fastest unit on the market. Gets hot the instant you turn it on, *red hot in 30 seconds.* What a time saver!

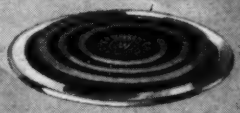
Dozens of times a week this new, exclusive SUPER-SPEED COROX Unit will clip precious minutes off meal preparation.

You can have piping hot soup for schoolday lunches . . . crisp bacon and eggs for tardy risers . . . frozen or fresh vegetables brought to steaming . . . in 3 short minutes. You can have leftovers warmed and ready for eating in less time than it takes to set the table . . . afternoon tea for a quick pickup in a minute and a half.

You'll love all the other features of the new Westinghouse *Speed-Electric* Ranges, too. The Color-Glance Controls . . . the Miracle Sealed Oven and the timer that automatically controls it . . . the HeatGuard Seal that keeps out all disturbing air currents and makes it possible to bake in *any* rack position . . . even the "Quality" feel of the door when you close it.

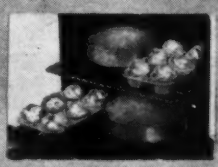
See your Westinghouse retailer now. Learn about all the new Westinghouse *Speed-Electric* Ranges. There are models to suit every family need and budget. Westinghouse Electric Corporation, The Electric Appliance Division, Mansfield, Ohio.

*Trade Mark



Only the
Westinghouse
SPEED-ELECTRIC
RANGE
Has this SUPER-SPEED COROX Unit

It's new. It's exclusive. No other unit can compare for speed and accurate cooking results. Gives you short order cooking that is really short. Try it once, and see.

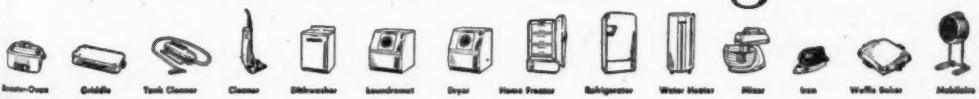


MIRACLE SEALED OVEN

Keeps *all* the heat inside. Now you can bake in any rack position and be sure of perfect results every time.

See TV's Top Dramatic Show . . . WESTINGHOUSE "STUDIO ONE" . . . Every Week

YOU CAN BE SURE . . IF IT'S Westinghouse



Editor's Chat

THANKS

You who read ELECTRICITY ON THE FARM Magazine have been exceptionally generous with your best wishes for me as editor. I sincerely appreciate the many letters that you have written. Now that we have gotten acquainted, write often.

HELP MEN WANTED

Once again the newspapers are swelled with "Help Men Wanted" ads. Defense work, the draft and the search for higher wages are making it increasingly difficult to find and maintain labor on the farm.

Our defense against Communism is a defense of our very existence. No one can sincerely argue against the decisions reached by our Government to build this defense. How it is maintained and operated will be debated as long as it is necessary to have one. Whether we did everything we could to prevent the situation that we now find ourselves in is another question. Why bring up all the "if's" anyway; what's done is done. The point is our enemy is strong. The only way to prevent war with him is to become stronger than he is.

Hours of productive labor—by men and women, along with raw materials, are what go to make up the articles of defense. A major part of this defense is the productivity of our farms. Just as in the steel plant, the woolen mill or the atomic plant, we need certain man-hours and tools on the farm. You can rest assured that the need for labor by our manufacturers will continue as in the past to be closely scrutinized. They found long ago that a job performed by the hand of a human is the most expensive. Machines, electrically operated and controlled, are substituted whenever possible. The farm that produces food and fiber for defense must also continue to substitute machines for men. I know this story has been told many times before, but the future demand for labor makes it imperative that we really practice this substitution now.

Just how can you substitute a machine for a man? Here are just a few ways: barn cleaning mechanically, grinding and mixing feed automatically, making running water available everywhere it is needed, elevating heavy loads, automatic chick brooding, fencing electrically, etc.

Saving labor today is a responsibility that we *must* accept.

TOO GOOD TO LAST

Not long ago a great discovery was made as far as the shrimp fishermen were concerned. Enormous beds of jumbo shrimp were found in the Gulf of Mexico off the coast of Mississippi, Alabama and Florida. The shrimpers at St. Augustine, Florida, like many others, abandoned their old beds for more and better shrimp in the Gulf.

This left the seagulls at St. Augustine stranded for they had depended on the waste from the shrimpers' boats for their food. Now this was a fine arrangement as long as it lasted, but it was a tragedy for the seagulls because unlike most seagulls in other places, they had forgotten how to fish. There was no need to put forth that effort as long as their livelihood was guaranteed. As a result, most of them starved to death even though there were plenty of fish for them. Something for nothing had destroyed their initiative completely.

Too many people have the idea that their government should take care of them. A good government does not try to do everything for its people from the cradle to the grave. A good government guarantees its people the freedom to run their own lives and their own businesses.

There is no such thing as free enterprise in a welfare state, and with no free enterprise, there is no need for individual initiative. This thing we call initiative has played a leading role in the development of our country. In order that we may continue to develop and maintain leadership in the world we cannot afford to dull it in any way. If we allow the threat of a welfare state to continue growing here in the USA our future is certainly in danger—just as much from within as from without.

Let's not forget how to do our own fishing!

Jim Ridout

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In addition . . . all these advanced features

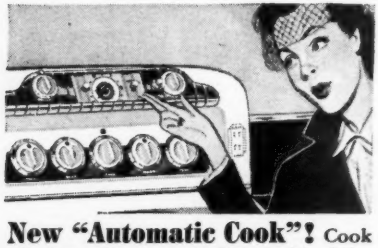
• Exclusive smoke-free "Broil-under-Glass" • Thermo-Color Controls • Huge 5530 cu. in. Banquet Oven • Additional Heat-Saving Thrift Oven • Automatic Timing • Super Speed Surface Units

See it Now at Your PHILCO Dealer

LOOK TO KELVINATOR FOR ALL THESE NEW IN FARM APPLIANCES!

Now! KELVINATOR Electric Ranges give you Amazing New Heat-up Speed!

New Double Ovens! Bake in one oven . . . broil in the other! Bake as many as six pies at once in the big oven (it's 17" x 17" x 19¼") with no need to shift pans. For, with Kelvinator's even-heat circulation you'll get even browning in all parts of the oven. Enjoy fast, radiant-heat broiling, too! Get results similar to charcoal-broiling!



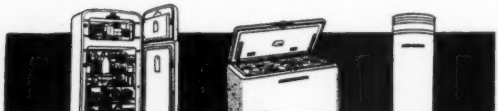
New "Automatic Cook"! Cook whole meals *automatically* in the big right-hand oven! Just set it . . . and forget it! . . . and go about other tasks with confidence. For with Kelvinator's "Automatic Cook" on the job, your meals are cooked with the accuracy and safety you get only with electricity.

Get Exact Heat Quick! Get Right Results Every Time—With Less Work!

Now, Kelvinator brings you new heat-up speed that gets cooking off to a really fast start . . . in today's most beautiful electric ranges! New quick-heating 7-heat surface units hit cooking heat *fast!* The even faster "Rocket" Unit hits cooking speed in seconds! Radiant broilers start broiling in ten fast seconds . . . and the mammoth oven heats up to 350° in less than five minutes!

And that's not all! New "Colormatic" Controls show you exact cooking heats at a glance. New Minute-Timer rings bell when foods are done. And you'll welcome, too, Kelvinator's automatic cooking control, matchless convenience and low cooking cost! See your Kelvinator Dealer for full information, now!

SEE! OTHER NEW PRODUCTS FOR BETTER FARM LIVING!



At left: new Twin Control Refrigerator—separate control of below-zero cold in giant freezer—separate control of cold *and* moisture in food compartment! Food compartment defrosts automatically. Center: one of 4 new, dependable Freezers designed for farm needs! Right: cylindrical model in full line of automatic electric Water Heaters! See them at your Kelvinator Dealer's.

Get more—Get Kelvinator

OLDEST MAKER OF ELECTRIC REFRIGERATORS FOR THE HOME!

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ELECTRICITY ON THE FARM Magazine

ELECTRICITY: *Versatile Energy for Many Farm Uses—Power, Light, Heat, Electronics.* Easily adapted, started, controlled: automatic. Labor doer and saver, money maker, and product improver and increaser. Used intelligently, electricity changes the whole aspect of farm life and production.

Crop Curing Comes of Age

New York State Farmer's Recognition of Value of Mow Cured Hay is Typical of Dairy Regions

By MORRIS H. LLOYD†

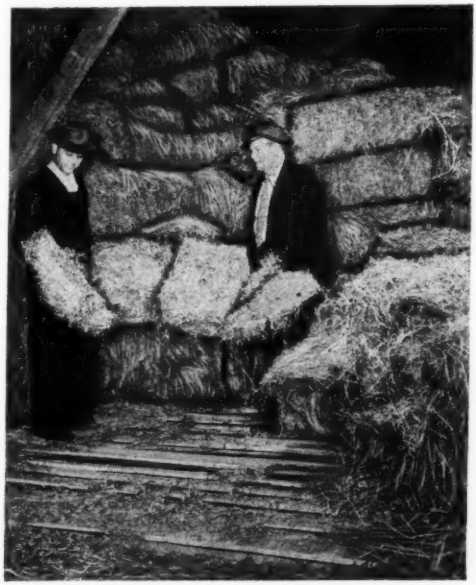
Drying hay by forcing air through it in the mow has been practiced by farmers producing hay since 1935. The first mow-curing systems were installed in New York State in 1944. That year fifteen farmers decided to try this new method of making hay. The results were so good that every year since then some of their neighbors have decided to cure their hay in the same way. Today about 400 farmers in New York cure some if not all of their hay in the mow with forced-air circulation. Many of them have installed a second or third mow drier and a few have four systems.

Our first installations followed the general plan of the Tennessee system, using a main air duct through the center of the mow. Smaller lateral ducts branched off each side of the main duct. Then the Virginia system came into use. The center main duct was a duplicate of the Tennessee system. A slatted false floor was built on each side of the main duct to carry the air out under the hay. This took the place of the lateral ducts. The majority of the mow driers in New York are of the slatted floor type. During the last two or three years many other designs have been used. In narrow, high mows some of the driers use simply a triangular or A-frame duct, or a duct with a square framework. This is covered with slats if long hay is to be dried or with one-inch mesh wire for drying chopped hay. Vertical flues or "chimneys" have been used in a few mows where chopped hay is to be stored more than sixteen feet deep. For baled hay some systems use simply a stout framework of 2" x 6" planks, over which the bales are piled in layers.

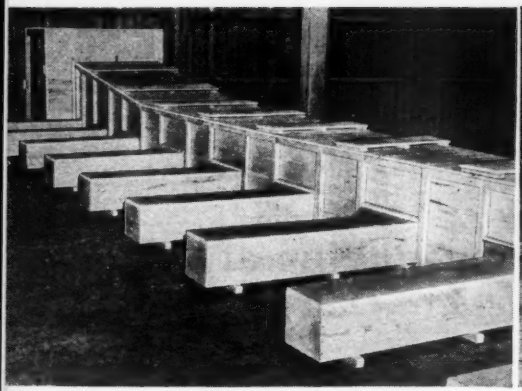
Most of the New York installations use a 5 hp motor. Next in popularity is the 3 hp system, then the 7½ hp, with a very few larger than 7½ hp or smaller than 3 hp. In most of the very large mows it seems to work out better to use two or more fans of 3 or 5 hp rather than one larger fan. Almost all the installations use a propeller fan as this type of fan doesn't need any changing of speed or adjusting of dampers as the mow is filled. Seasonal oiling and greasing and tightening of the belts are required with any fan.

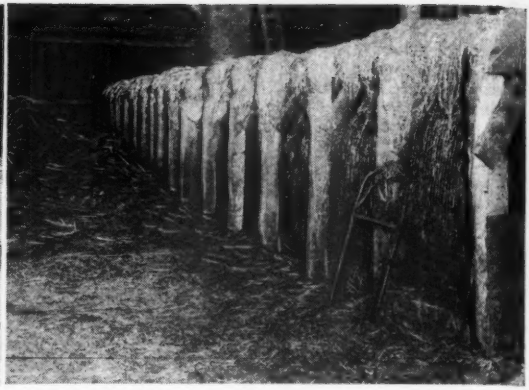
Early in the haying season most farmers using mow curing cut hay late in the afternoon, after the sun has lost most of its drying power. They cut only as much hay as can be put in the mow the next day. The hay lays in the swath all night. Next morning after the dew is off it is raked. Then in the afternoon it is put in the mow. It is only necessary to guess one day ahead on the weather, so if a wrong guess is made and it rains, not much hay is down. But by having to guess only one day ahead, it is often possible to start

† Mr. Lloyd is Agricultural Engineer, Niagara Mohawk Power Corp. Buffalo 3, N. Y.



The best boosters for mow cured hay are those farmers that have installed such a system. Here W. W. Naff of Boones Mill, Va., is showing one of his neighbors one of the 3000 bales of quality alfalfa hay he dried last year. Mr. Naff cured four cuttings of alfalfa during 1951 without any loss from the weather. He says, "My second cutting would have been a complete loss if I couldn't have put it in the barn green. It rained for a whole week starting the day after I cut it. Saving this one cutting paid for my drier."





Left: This early type of duct system utilizes laterals out from the main duct. These laterals are one inch above the floor to allow the air to pass from them up through the hay. They should also end within six feet of the outside wall of the mow. There are slots on top of the main duct that allow an even distribution of air through the hay piled in this area of the mow. The lateral ducts are removable and may be stored as the hay is removed. **Right:** The newer type of square duct five feet high and five feet wide lined with one by two inch turkey wire. This type of installation is used to dry chopped hay.

haying earlier in June than anyone would dare to start without a mow drier.

With good drying weather the hay is usually field-dried for five to six hours if it is to be put in the mow as long hay. For chopped or baled hay about an hour longer field drying is needed. This amount of sunshine will usually bring the hay down to around 40 per cent moisture for long hay and the extra hour will bring it to 35 per cent for hay that is to be chopped or baled. Such hay is dry enough to let the air get through it on the drier, yet it is moist enough that the leaves will not shatter off when it is handled in the field. Later in the season, especially for second cutting, hay is often cut in the morning and mowed away in the afternoon of the same day.

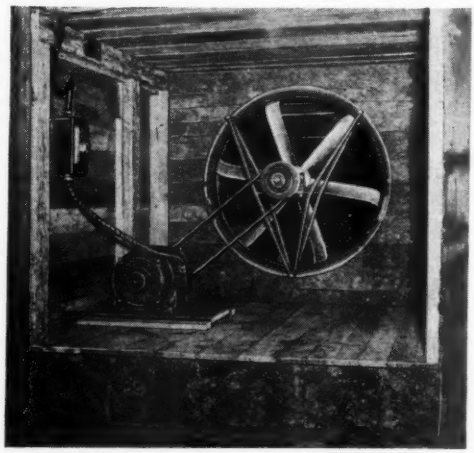
The fan is operated continuously, rain or shine, as long as any hay is being dried and for five or six days after the last hay is put on. During rainy or damp weather the hay in the mow may not dry much but at least it will stay cool as long as the fan blows air through it. It will not pick up moisture from the damp air.

A typical hay mow measures about 36 feet by 32 feet. Most farmers are not equipped to put much more than two or three feet of hay a day on a mow of this size. With a mow drier they can put this amount of hay in the barn every day that the weather permits. The hay will cure fast enough so that they can fill the mow at this rate yet never have more than six to eight feet of moist hay on the drier at one time.

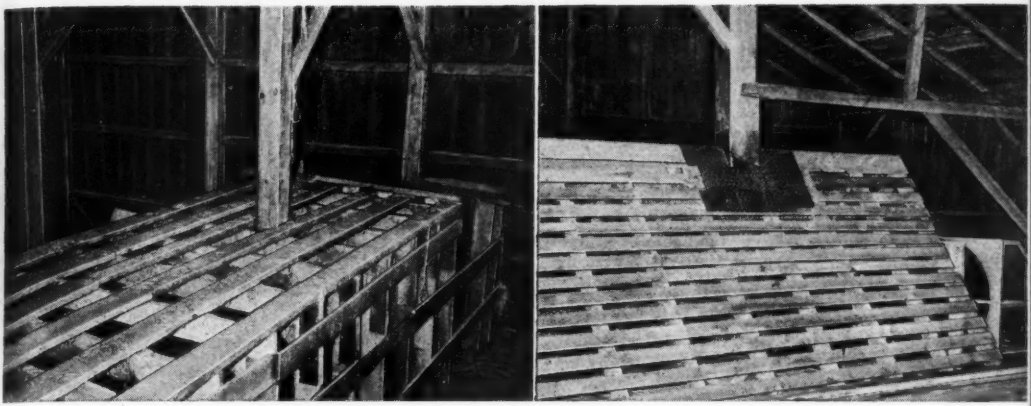
The mow drier is a help in any weather. Even in a good season, if the hay is completely dried in the field a lot of leaves are lost when it is harvested. Those leaves are saved when the drying is finished in the mow. Regardless of the quality of the hay cured, the mow drier makes it possible to start haying earlier by taking advantage of the good days early in the season. In a rainy season it often makes it possible to get hay in the barn that would otherwise be lost in the field.

Some farmers have installed mow curing systems to "beat the weather man." Some want protection against spontaneous combustion. Some want to get started earlier with their haying. Some want to save the leaves. Let's see what some of them say about their reasons for putting in a mow curing system and what they think of it now that they have used it.

Mr. Norman Carls of Allegany, N. Y. installed the first system for long hay in Cattaraugus County in 1945. He installed a second one the next year. He says, "Just the feeling



This is a view of the fan house of a mow hay drier that illustrates a typical fan installation. The motor starter with overload protection is mounted on the left wall. The protective screen over the front of the fan house was removed while the picture was being taken.



Left: This is a simple square duct utilized to dry baled hay. If the duct is in the center of the mow as shown here, a slatted floor should be installed in conjunction with the duct when the mow is over 16 feet wide. **Right:** Here is a triangular or A-frame duct designed specifically for narrow mows. The slats over the frame are covered with chicken wire to keep chopped hay from falling through. Note the metal flashing around the post at the peak of the frame. Without this the air would chimney up around the post and not pass through the hay. This would cut down on the efficiency of the system.

of safety makes a mow drier worth while to me. I can sleep nights without wondering whether the barn is going to burn up."

Another farmer who feels just about the same is Mr. Joseph Cole of Cuba, N. Y. Mr. Cole says, "One of the main reasons we installed a mow drier was that we consider it to be about the cheapest form of insurance. We can sleep nights without fear of spontaneous combustion. We also believe it is one of the biggest improvements we have made in our hay-making practices. Regardless of whether hay is put up long, chopped, or baled, I consider a mow drier a necessity." Mr. Cole has used his drier for two years, drying chopped hay.

Mr. Alton MacDuffie of Pavilion installed the first mow drier in Genesee County. He has this to say: "I like nice, green hay and the drier gives it to us. Also it saves a lot of time in haying because the hay only needs to dry in the field about one day. We start haying earlier in the season, around the middle of June, and so we finish earlier. We get the first cutting of alfalfa off the fields at the best stage of maturity and get a better second cutting as a result. I like the mow drier, too, because it keeps the hay from heating." When Mr. MacDuffie first heard about mow curing he thought it would delay the haying operation waiting for the hay to dry in the mow. He installed his first drier in 1946 and a second one the next year. The fan and motor on the first drier are mounted on a portable framework so that when the drying job is finished, they are moved to another barn and used on a bin for drying of grain. But that is another story. Mr. MacDuffie was the first farmer to put long hay in the barn with a wind-stacker type of blower and one of the few in Western New York who uses a long hay blower in connection with mow curing. He finds that this is an easy way to be sure of spreading hay evenly on his driers and says it feeds out more easily than hay mowed away with the conventional fork or sling.

Mr. Hollis Clark of Wyoming, N. Y., has this to say. "I particularly like the mow drier because we were able to get all our chopped hay in without loss of leaves. We were able to put hay in the mow on days when complete field-curing was impossible." This is Mr. Clark's first season feeding mow-cured hay and the second with grass silage. He gives the cows all they will eat of both and says that they seem to prefer the hay.

Mr. Mark Haskins of Jamestown, N. Y., has used a mow drier since 1947. "If I had to do without any piece of hay equipment," says Mr. Haskins, "the last thing I would want to sacrifice would be my mow hay drier, with the possible exception of my mowing machine. Before I put in the mow drier I was afraid it would be difficult to mow away the damp hay. I find it is no more difficult, and it is much cooler working in the mow. The hay feeds out easier. A hay drier is a real necessity for grass farming." Mr. Haskins is planning to install another drier.

Mr. Harold Bratt, who lives not far from Mr. Haskins on the same road, is equally well pleased. He says, "I have found after three seasons' experience that when I have run out of mow-cured hay and had to go back to feeding field-cured hay, our milk production dropped off one full can per day with fifteen cows. Since installing the drier we have been able to start haying by June 10th. It has made it possible to cut the hay at the best stage of maturity. I find it easier to mow it away and it is much cooler working in the mow. I'm sure that the drier paid for itself in the first two years." Mr. Bratt, also, is planning to install a second drier in the other half of his mow.

Mr. G. M. Farwell of Hinsdale, N. Y., has used a small drier for two seasons, the first year on long hay, the second on baled hay. He is planning to in-

stall a larger drier in another mow. "My cows will eat 40 lbs. of mow-cured hay compared with 10 lbs. of field-cured hay, with the same consumption of grain and silage," he says. "I estimate that this has given us at least two extra cans of milk per day from thirty cows."

Mr. J. M. Burdick of Little Valley, N. Y., has the largest mow drier system in Western New York. He has four 5 hp units in a mow 96 feet by 42 feet. He dries chopped hay. He installed two units in 1946 and two in 1947. He keeps accurate production records on his herd and says, "We have increased our production per cow in the past three years an average of 100 lbs of butter fat and 2000 lbs of milk. I believe this is largely due to the quality of hay we have been making since we installed our four mow driers. I believe we can make even better hay on our driers than we have made thus far." Mr. Burdick is planning to install a fifth drier in a wing off his main barn.

The first mow curing system in the south-western part of New York State to be used for chopped hay was an installation with two 5 hp fans on the farm of Mr. Willard R. Reynolds of Franklinville. Mr. Reynolds says, "My milk records show that I was able to maintain the same or slightly higher production the first winter I fed mow-finished hay. I fed about 25% less grain. My experience during the six years I have had mow driers has convinced me that the total cost has already been repaid by feed savings. My cows have been in very noticeably better condition. My calves have been doing much better than in the years before installing the driers. I have had a lot less veterinary expense for cases of milk fever, indigestion and mastitis in the past six winters as compared with preceding years. I think that at least part of the credit goes to a better quality hay."

There you have the verdict of nine farmers. Not all have the same reasons for liking this method for curing their hay. But there isn't one of them who would ever think of going back to field curing again.

Fuel Heat Can Improve Drier Performance

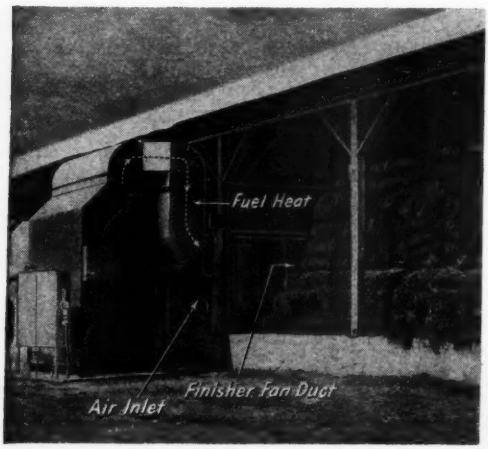
By J. B. STERE

Did you ever observe how your clothes are dried? As far back as I can remember mine have been dried each week—without fuss or a miss. In summer days with a good warm breeze the clothes dried fast on the back yard clothesline. In rainy or winter days they are dried in the basement or in the attic. Our neighbor uses an electric drier almost every day to dry the baby's wash.

In each of these cases it is heat that evaporates the water and air carries off the vapor. This process is called drying. During warm summer days atmospheric heat evaporates the water while in the cold days or in the electric drier fuel heat is added to atmospheric heat for faster drying.

The same process takes place in drying farm crops as in drying clothes. A hot dry breeze evaporates and carries off more water than cold damp air. Adding fuel heat to cold damp air increases its drying capacity. These facts are well understood. But, there are some basic differences between drying crops and clothes that make crop drying a man-size-job.

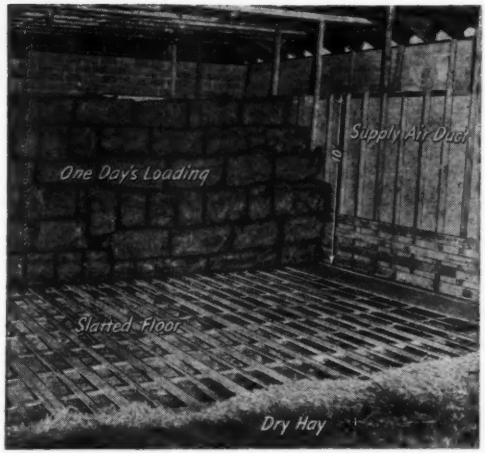
First, there are tons of water



Above: A close-up view of the drier. In order to facilitate handling of wet hay, small size bales are used. When field drying was very slow some bales weighed 57 lbs when placed on drier and 23 lbs when removed. The moisture content of this hay was reduced from 64% to 12% by the drier. Hay of this moisture content must be baled loose so air can penetrate the bale. Small loose bales will stand handling much better than large loose bales. **Right:** Ear corn being dried in the shed type batch drier. Because of the late harvesting season for corn it is frequently necessary to use fuel heat to assure drying. Ear corn also drys slower than grain or hay.

Left: A continuous batch type crop drier using air and oil heat on the farm of Howard Seiple, Easton, Pa. About twenty tons of hay are placed on drier each day. Drier has a storage capacity for four days loading. At the end of this time, first day's loading is removed to storage and another batch placed on the drier.

Below: An inside view of the same batch drier. Because of the low wide mow the slatted floor type air distribution is used. This type system also makes it easier to properly place the hay in the mow.



to be evaporated from most crops while in the family wash there are but a few pounds. Second, crops are alive and will generate heat while clothes are made of inert materials. Then too, crops vary from the thick ear corn to the thin plant leaf which affects the drying rate.

It remains, however, that 1000 heat units (btu's) are required to evaporate a pound of water. The three sources of heat available for drying crops are: from the air, from the crop and fuels such as coal, oil, gas, electricity, etc.

Air Heat

It is advisable to use as much air heat as possible without impairing the quality of the crop. As soon as hay is cut, for example, air drying starts. Field working that stimulates fast and uniform field drying is a sound practice. Before leaves shatter or color and aroma losses becomes excessive hay should be placed in the barn away from the weather. At this point the moisture content of hay (about 40%) is too high for safe storage. To complete the drying for safe storage air is forced through the hay. This process, known as "barn finishing," is a sound and growing practice. The cost of this heat is the cost of the equipment and power to force air through the hay.

Crop Heat

During long periods of wet weather it is necessary, with a barn finisher, to rely on crop heat to complete the drying. This is accomplished by stopping the fan until the hay heat builds up to 90° F then starting the fan to carry off the vapor. It is generally recommended that as little as possible crop heat be used. Heat used for this purpose is no longer available in the crop for feed. Fast field and barn drying keep crop heat to a minimum.

When Is Fuel Heat Needed

When full and efficient use of air heat is inadequate to assure quality of product and drying capacity desired then fuel heat should be considered. Do not use fuel heat to overcome bad management or uneven air distribution. Fuel heat cannot correct these conditions. The basic reasons for fuel heat are: when the desire to retain top crop quality each year is expressed, when large quantities of water are to be removed in limited time and when drying of late fall crops must be assured in order to dispose of the crop.

How to Use Fuel Heat

It is most important that fuel heat be used safely. The barn finisher has, from known experiences, eliminated the hazards of spontaneous ignition. Fuel heat should be used in such a manner as to maintain, and not destroy, this accomplishment.

For most economical drying, fuel heat should be added to the maximum practical volume of air. Adding heat, in good weather, at the expense of air has made it appear to some that fuel heat is always needed. Contrary to many opinions fuel heat is most effective in bad weather or near the completion of the drying period. For example, where hay is first cut and high in moisture content air heat is most effective, as field drying experiences have shown. As the hay becomes dried the rate of water removal, for same air volume, becomes less. It is here that addition of fuel heat pays its biggest dividends.

Amount of Fuel Heat

A thousand heat units (btu's) are required to evaporate a pound of water. If this amount

. . . . . (More on page 14)

Left: Mr. Ackerman, when he finishes his milking chore, will have to drive the cows out of the barn. Thanks to the "Shoo Fly Fan," which can be seen gently waving over the backs of the cattle. Neither man nor beast is bothered by the winged pests. In addition, Mr. Ackerman just has to spray insecticide on the underparts of the cows. **Right:** Here you can see the motor that was substituted for the boy commonly found operating "Punkah" fans in the Orient. Through a vee belt, it drives the crank wheel. A pitman connects the crank to one of the fans and a connecting rod ties the two fans together.

Cow Stable Shoo Fly Fan

By R. E. JOHNSON†

Here's a fan idea brought back from India. Frank Ackerman cools the air in his milking barn and shoos the flies with the same swipe. The odd device, suspended on chains from the ceiling of the cow barn, sweeps slowly to and fro while the milking is being done.

Punkah fans, as they are known all over the Orient, are commonly used to freshen and stir the heated air in the house. There, however, they are operated by man power. Of course, the man is usually a boy. A rope is run from the fan to a back room or basement. There it is attached to the hand or foot of the person furnishing the motive power for the contrivance. In his earlier travels around the world as an oil well driller, Mr. Ackerman saw many of these.

In 1930, after his health failed, he was obliged to retire to his Wood County, Ohio farm. There, in his own cow stable, he applied the idea. He did, however, make one significant improvement. Instead of hiring a man at a prohibitive price, Mr. Ackerman used a ¼ hp motor for the job. Belted to a 40 inch wheel, the motor runs the fan for three hours for one kwhr.

During fly season, Mr. Ackerman just has to spray the underparts of the cattle with insecticide. When the flappers are in motion, the pests stay away from both man and beast. And the surprising thing about it is that it does not frighten the stock. The cattle like it so well that it is necessary to drive them out of the barn when the milking chore is finished.

Although Mr. Ackerman is now 75 years of age, he and his wife still care for their 15 head of Jerseys. And he does a considerable amount of the other farm work in addition. They give credit to the extensive use of electric dairy equipment which enables them to keep up with the work. A 5 hp motor on a small hammer mill grinds the cow chop. The modern milk house is equipped with a large milk cooler and an electric water heater, required in the production of grade A milk.

†Mr. Johnson is Manager, Farm Power Department, Toledo Edison Company, Toledo, Ohio.

For years the Chrysler Building in New York has been the second tallest man made structure in the world. It now stands in third place. The tallest structure has been and still is the Empire State Buiding. Second place is held by the new 1057 ft. television tower, erected by Atlanta, Georgia, Station WSB-TV. The new tower is just 11 ft. taller than the Chrysler Building.

Grain can be dried in bags by stacking around an open tunnel framework as illustrated, or arranged to form a tunnel to permit circulation of air through the bags. Bags removed as shown above to show end of tunnel.

Grain with high moisture content may be stored loose without damage if air is forced through it to remove the moisture as soon as it is placed in the bin. In the granary illustrated, a tight central duct supplies lateral ducts like the one shown. A lateral duct is extended into each bin.

Artificial Drying Saves Critical Crops and Increases Profits

U.S.D.A. records show an average of 35% of hay crops and huge amounts of grain spoil every year, due to high moisture content. Agricultural experts consider artificial drying as the most practical insurance against these losses.

Thousands of farmers are now installing crop-curing equipment every year. The same equipment is used to cure hay—baled or loose, small grain in bags or in bins and corn as it comes from the picker.

Take hay for example. Tests by U.S.D.A. on over 100 farms found only 9% U.S. No. 1 grade hay by field curing compared with 54% by the barn curing method. Mow curing at 40% moisture practically eliminates leaf shattering losses. Hay can be cut at the proper stage of maturity to preserve valuable protein and carotene and thus greatly reduce the amount of feed supplements required. In addition, barn curing speeds harvesting, practically eliminates the hazard of spontaneous combustion and increases the value five to ten dollars per ton.

Reduces Small Grain Spoilage

Artificial drying offers equal benefits to grain growers . . . a sure, economical way to take care of grain as it comes from the combine or thresher. It saves time and labor in turning and airing grain by hand. Assures full market price, without penalty for high moisture, within a few days after threshing. In some cases, savings in a single year practically pay for the equipment. The principle is the same as for hay drying—air is forced through the grain by a motor-driven fan to remove moisture.

A good installation. Westinghouse Farmotor is connected by heavy-duty detachable plug—makes motor easy to move. Farmstarter protects motor against overloading; automatically restarts motor if power is interrupted.

Selecting the Equipment

Artificial drying of hay and grain can be adapted to the needs of the average farm. The fan selected should deliver a large volume of air without excessive sound.

For dependable, low-cost operation, a Westinghouse Farmotor® is your answer. They are built to give safe, trouble-free service; are of the most advanced design and are pre-lubricated for life.

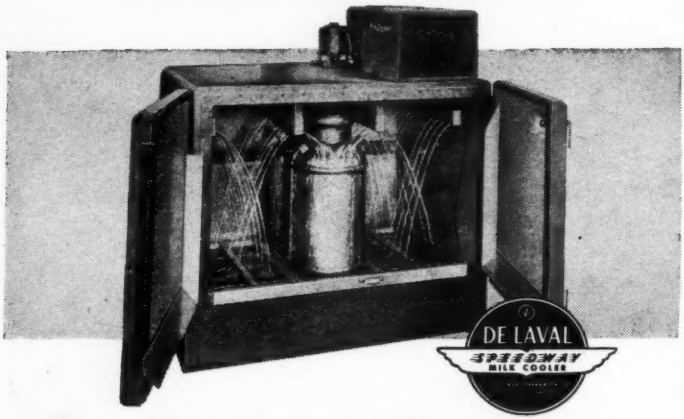
Westinghouse Farmstarters® protect the motor against overloads and provide for hand or automatic control of the motor.

For further information, see your power supplier or farm equipment dealer, or write: Rural Electrification Dept., Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

G-10141

YOU CAN BE SURE.. IF IT'S Westinghouse

FOR EASY, LOW-COST MILK COOLING



The De Laval Speedway "Front-Loader" Milk Cooler

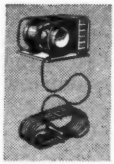
Here's a handsome, rugged new beauty of a milk cooler you'll be proud to have in your milk house. What's more important it will cool your milk from 90° to 50° or below in one hour or less. And it will do the job at low cost with all the dependability for which the De Laval name plate is famous.

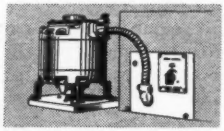
When you slide the heavy cans into and out of the De Laval Speedway "Front-Loader"—that's when you'll really appreciate it. No more heavy tugging and back-straining lifting for the scuff plates are only a little above floor level.

Now's the time to install the milk cooler you can count on—for efficient, low-cost cooling, long life and back-saving ease of use. Available in 4, 6 and 8 can models. See your local De Laval Dealer today or mail coupon.

"DROP-IN" UNIT

Refrigeration system is one compact mechanism, easily accessible and quickly replaced if ever necessary. Entire system hermetically sealed.





AUTOMATIC CONTROL

Cooling cycle automatically controlled. Continuous spray until milk is cooled—then automatic spraying at regular intervals to keep milk cool.

Regular De Laval Speedway Immersion-Type Coolers, Too

The famous De Laval Speedway Milk Coolers of the familiar immersion-type are also available with the time-tested De Laval Speedway "Drop-In" Unit.

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Fuel Heat Can Improve Drier Performance

. . . . . (Here from page 11)

of heat is added to a small quantity of air the intensity or temperature will be higher than if added to a large quantity. When drying crops in batches temperature becomes important. After water has been evaporated from any portion of the batch this portion of the crop will attain the same temperature as the air. During evaporation the crop temperature will be lower than surrounding air temperature.

In drying seed crops it is important to limit the temperature so as not to interfere with germination qualities. Heating grain too hot can impair its grinding qualities. Studies have indicated that heating hay above 120° F can hinder its digestibility. For these reasons temperature of heat in barn or batch driers should be limited. In each of the driers shown in the accompanying pictures, a thermostat is located in the air supply duct to stop the heater in event the temperature exceeds a predetermined setting. For hay and grains the thermostat is set at 120° F while for seed crops it is set from 80° to 90°.

A rough rule to use in determining the amount of heat for any volume of air for a desired degree of temperature rise is to provide 20 btu for each 1000 cu. ft. for each degree temperature rise. A 500,000 btu per hour heater will raise the temperature of 20,000 c.f.m. about 21° F.

Fuel Heat Costs

Cost of fuel heat varies over a wide range. The most influential factor in the cost is the amount of water to be evaporated. It cost 7 times as much to dry hay from 75% to 25% moisture as it does from 40% to 20%. It cost three times as much to dry hay from 60 to 20% as from 40 to 20%.

The batch drier shown in figure 4 dried hay under unfavorable weather conditions but with good field management and good use of air heat at a cost for fuel and power of about $5.00 per ton.

—9m proud 9 am a farmer!—

MARRIAGE: an institution which gives a man DOUBLE duties and, IF he's lucky, HALF the rights .... RINGWORM: an unsuccessful prizefighter .... EVERSTOPTOTHINK?—MANY a mother-in-law is a PUZZLE WITH CROSS WORDS .... T. J. McInerny tells this one in CORONET: A Dallas, Texas, census taker faithfully called EVERY night for a week at a certain address. At LAST she found the occupant at home—ANOTHER census taker .... SYMPATHY: that which one gal offers to another in exchange for ALL the details .... TABLOID: a SCREAMLINED newspaper .... By the same token, a TABLOID READER is one who just SCUMS through all the gory details .... Let's stay in the same rut—A SCANDAL is a SMALL BREEZE stirred up by a couple of windbags .... EVE: the first chicken to ruin a man's garden. (QUOTE) .... At her bridge club our little wifie overheard a couple of gals giving a mutual (and absent) friend a good going over. In reporting the matter to us later she remarked: "It sounded to ME like SOME one had a bad case of POISON ENVY." .... BARIUM: what you do to a dead dog .... GIVE THIS A LITTLE THOUGHT—If, as we are told, a HUSBAND and WIFE are ONE, THEN the HUSBAND, when seated with his wife MUST be BESIDE HIMSELF. (Caw! Caw!) .... A GREAT many of those so-called BRIGHT children SHOULD be applauded with ONE hand .... SNICKERSNORT-OF-THE-MONTH: A brand new Senator making his FIRST airplane flight was about to sit down when he rose suddenly and cried: "Ouch! WHO put that tack in the seat?" "THAT was NO tack," replied the stewardess sweetly, "we're flying low and THAT was the WASHINGTON MONUMENT." .... Eligible gals LOVE the tone of ANY bachelor's voice IF there's a RING in it .... Viewed from most any angle KISSING a girl nowadays leaves its mark on a man .... According to a friend of ours who JUST entered Uncle Sam's service: "A BRASS HAT is an officer of at LEAST ONE rank higher than YOU whom YOU don't LIKE and who DOESN'T like YOU." .... PARTING THOUGHT: He who rises early with the SUN shouldn't stay up late with the DAUGHTER. . . . . .

Your Pun-peddler,
DUFFY

If You Milk 10 Cows or Less...

HERE'S HOW TO SAVE TIME AND EARN MORE

←Time-Wasting
←Slow, Costly
←Unpleasant
←Unprofitable

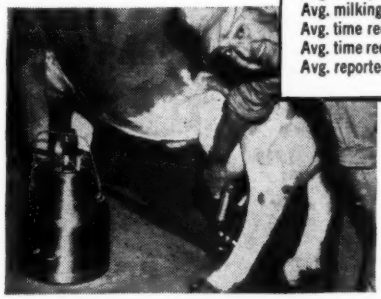
26 HAND-MILKED HERDS

Avg. size of herd	5.2 cows
Avg. number of hand milkers	1.3 persons
Avg. milking time per day	146.0 min.
Avg. time per milking	73.0 min.
Avg. time per cow	10.4 min.
Avg. time per day to wash utensils	21.3 min.

These figures, which so clearly show the faster milking and time savings accomplished by the De Laval Speedette Milker, are taken from actual time studies on average small herds under normal every-day conditions.

24 DE LAVAL-MILKED HERDS

Avg. size of herd	9.6 cows
Avg. milking time per day	76.5 min.
Avg. time per milking	38.2 min.
Avg. milking time per cow	3.9 min.
Avg. time required to wash milker per day	15.1 min.
Avg. time required to wash milker per milking	7.5 min.
Avg. reported daily saving over hand milking	90 min.



←Saves Time
←Fast Milking
←Easier Job
←More Profit

DE LAVAL SPEEDETTE MILKER

In addition to time and labor savings, faster milking and more pleasant work, the De Laval Speedette Milker produces cleaner milk. It is a De Laval-quality, dependable milker, *low in first cost, fast and inexpensive to install.* Pump never requires oil—small motor operates on 110 v. line. See your De Laval Dealer today for full details.

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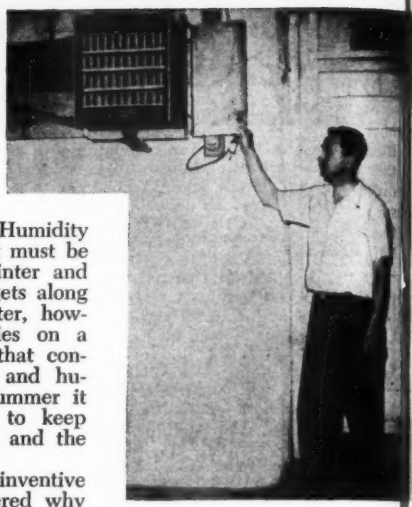
"Well" Cooled Hatchery

Summertime Cooling Gives Better Hatch, Cuts Incubator Room Labor Costs

By J. H. BODWELL†



Mr. Hardy needs all the cool air he co get in the summer for his incubato rooms. This heating unit is supplie with 55° water in summer. Additiona cool air is sucked from an adjoinin room through the short duct shown i the upper left corner.

Mr. William Hardy of Chester, New Hampshire, says that water is the greatest blessing in his poultry business. He has found like so many other farmers of our country that running water is essential for modern farming.

Mr. Hardy maintains an average flock of 16,000 laying birds. He grows, annually, 40,000 chickens for replacement purposes for himself and neighbors. He is also a hatcheryman. He hatched out over 1-million chicks last year. Hatching is the biggest part of his business. He has two incubator rooms, one 60′ x 30′ by 10′ high, and the other is 80′ x 40′ by 15′ high. Just as it takes a lot of heat for these houses in the winter to maintain 80°F., it also takes a lot of cooling to keep the temperature at 80°F in the summer. Humidity is another problem. It must be kept at 75%, both winter and summer. Mr. Hardy gets along very well in the winter, however, because he relies on a simple heating plant that controls his temperature and humidity. But in the summer it hasn't been so easy to keep the temperature down and the moisture up.

Mr. Hardy being an inventive type of fellow, wondered why he couldn't utilize his heating plant in the summer to keep his incubator room cool. He knew he had plenty of 55° water in his 3 wells. So he began "cogitating." Here is what he did; he filled the large boiler, pipes, and radiators of his heating plant with fresh cool water daily. The water in the system was kept circulating. The fan back of the radiators then blew cool air rather than hot air.

Mr. Hardy had a room adjoining his hatchery rooms that was always cool. This room was well insulated and used for storage. For another source of cool air, he simply built a duct from this room into the hatchery. He directed the duct so that it would furnish cool air to a fan back of one of his radiators which exhausted the cool air from the duct into the hatchery room. The duct was 8″ x 10″ and about 2′ long. This gave Mr. Hardy two sources of cool air for his incubator rooms.

Mr. Hardy used 3 fans to exhaust the hot air generated by the incubators. Two of these fans were 16″ and the other was 24″. He has found that those exhaust fans are just as useful in the winter as in the summer.

Here is how Mr. Hardy gets more humidity in his incubator rooms; he has handy valves on the radiators that can be opened. This allows a fine spray of water to trickle over

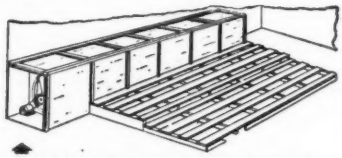
†Mr. Bodwell is Director of Rural Service, New Hampshire Electric Company, Portsmouth, N. H.

Hartzell barn curing means . . . Increased Hay Value

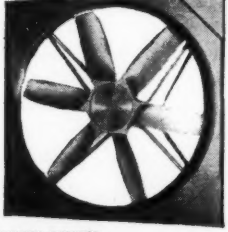
High feed value, higher market price, insurance against rain damage in the field and spontaneous combustion in the mow — those are just some of the *extra profits* you gain when you install a Hartzell system for curing hay in the mow.

Hartzell agricultural fans have been especially developed for farm use. Light weight, yet sturdy; cannot overload the motor; low power cost; famous exclusive curved orifice air-seal ring gives more air movement. And the motor can be used for other farm jobs.

Write today for your *free* booklet showing installation photos, sketches, diagrams and other data.



A widely-used system for hay drying. In narrow mows the air-tunnel is at one side; in wide mows, it is centered and the slatted floor is on both sides.



Note the sturdy construction of the Hartzell fan. Built for rugged farm use—for operation year after year without attention.

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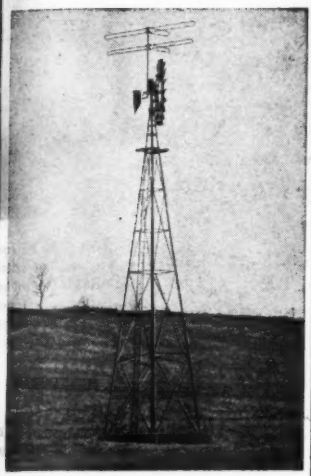
HARTZELL PROPELLER FAN CO.

DIVISION OF CASTLE HILLS CORPORATION

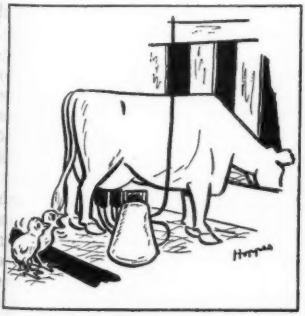
DEPT. M, AGRICULTURAL DIVISION, PIQUA, OHIO

the radiator pipes. This increases the moisture and it also helps to reduce the temperature in the room.

Mr. Hardy reports a 5% better hatch now in the summertime than he had before putting in this system. Less labor is required also. Time is not consumed in checking the incubator rooms to be sure of proper temperature and humidity.

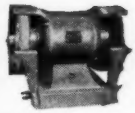


Henry Josephs, of Gardenville, Pa., utilizes his windmill tower for his television aerial. He reports that he is getting excellent reception. Since electricity has been pumping his water, his windmill tower was next to useless. That is, until he saw his television aerial at the top of it. Mr. Josephs is passing along this idea as many other farmers besides himself have switched from wind drawn water to electrically pumped water, so don't destroy your windmill tower if you are planning to buy a television set soon.



"If I had the battery she's got I'd get a new one. Twice a day she has to have it recharged."

Fix them up... Make them last...
Keep them rolling with
HOME-UTILITY Electric Tools



HOME-UTILITY
6" Bench Grinder
$45.00

HOME-UTILITY
5" Sander-Polisher $32.95

6"
Heavy-Duty
LECTRO-SAW
$56.50

Husky Drills, Saws, Grinders, Sanders help you stop trouble before it starts!

Taking extra-good care of your present farm machines is the surest way to beat new equipment shortages. And Home-Utility Tools are the finest helpers you can hire for the job! These versatile, labor-saving tools will help you make repairs and adjustments—clean your equipment for longer life and smoother running—install labor-saving accessories and attachments, catch minor faults before they become major troubles.

QUALITY-BUILT BY BLACK & DECKER, Home-Utility products are real tools, not mere toys! They have extra-powerful motors for high-speed work... husky housings and extra-tough parts for longer useful life. Compact, balanced design for easy handling with less fatigue. Try Home-Utility Tools today at your hardware or implement dealer.

HOME-UTILITY Tools Speed Up Jobs Like These:

SHARPENING *hand tools, mower blades, sickle bars, scythes, corn knives, hatchets, kitchen knives.*

DRILLING *holes in wood or metal for mounts and supports.*

BUILDING *stake bodies, out buildings, cribs, pens.*

REMOVING *rust, dirt, old paint, light weld spatter.*

REPAIRING *machinery, tools, harness.*

ELECTRIC HOME-UTILITY TOOLS

Products of HOME-UTILITY Div., BLACK & DECKER Mfg. Co., Dept. H4G, Towson 4, Md.

EAGLE

The Original Time-Tested
ELECTRIC BARN CLEANER

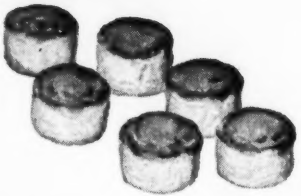
GIVES YOU MORE VALUE... MORE ADVANTAGES

Only Eagle gives you so many important time-tested advantages: special forged steel link chain (flexible — never freezes or binds — needs no tightener sprocket — takes up slack gradually), self-cleaning conveyor flights, patented leak-proof elevator, safe, enclosed mechanism, patented cover guards, sturdy construction.

Save labor, time, and money — do barn cleaning in minutes instead of hours.

Write for folder EF describing Eagle — the original — time-tested and proved on scores of dairy farms.

EAGLE MANUFACTURING CO.
414 E. Winnebago St., Appleton, Wisconsin
Farm Equipment Since 1888

Now you can bake  and roast

at the same time . . . in the same oven!

The first range of its kind! Frigidaire's new and flexible "Wonder Oven" Range!

Here's the perfect range for farm kitchens . . . with two complete ovens that become one big oven in just a twinkling! Now—you can pair up puddings with pot roast, casseroles with cake, pork chops with pies—or bake and broil at the *same time* in the *same oven!*

Other advantages include beautiful new styling, the new Cook-Master Clock Control that frees you from oven watching, thrifty 5-Speed Radiantube Units and Frigidaire's Lifetime Porcelain inside and out. For real cooking ease, see Frigidaire's meal-making "Wonder Oven" Range.

← Look! It's 2 Ovens!

Each separate, each with its own heat control. Compact, complete, thrifty. Ovens are 10½ and 9½ inches high—each has room for all normal needs.

Presto! It's 1 Oven! →

Drop the center heating unit to its bottom

Presto! It's 1 Oven! →

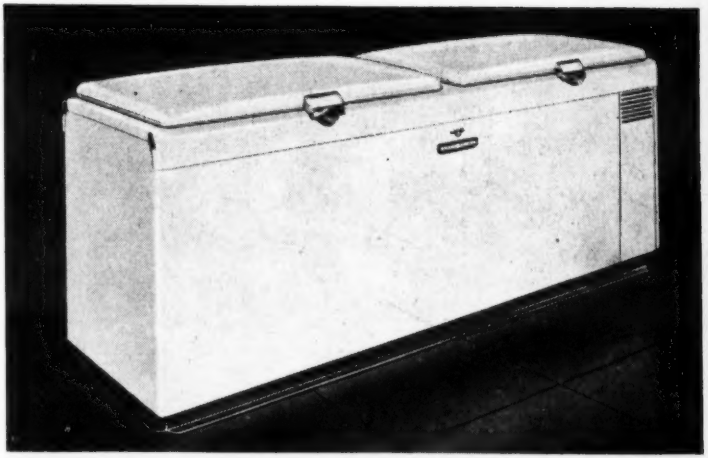
Drop the center heating unit to its bottom position—you have one giant oven—20" high, 16" wide, 19¼" deep. Big enough for a 30-lb. turkey.

Frigidaire Appliances for the Farm Home

Refrigerators • Electric Ranges • Automatic Washer • Air Conditioners • Electric Ironers • Food Freezers • Milk Coolers
Electric Dehumidifier • Electric Water Heaters • Kitchen Cabinets and Sinks • Automatic Clothes Dryers

← **New Frigidaire De Luxe Refrigerator**—*made* for once-a-week shopping! This 10.7 cu. ft. refrigerator holds more food than previous models without taking any more kitchen space, and gives you the different *kinds* of cold needed to keep *all* foods safe.

New Frigidaire Food Freezers → are available in sizes designed to meet most needs. Whichever size you choose, you'll find new convenience features, new beauty. Plus a constant flow of *safe cold* from Frigidaire's famous Meter-Miser, to protect your frozen foods.



Visit your Frigidaire Dealer next time you're in town. Or write Frigidaire Division, General Motors Corporation, Dayton 1, Ohio. In Canada, Leaside 12, Ontario.

Frigidaire reserves the right to change specifications and prices, or discontinue models, without notice.

Electrical Housekeeping

Edited by NAN SHAW . 329 Memorial Union, Ames, Iowa

Home Laundry Labor Lighteners

This past month as I have read letters from many of you telling how electricity helps with your laundry, I have wished you could read them all.

However, the three letters printed here may give you an idea of how you can: (1) enjoy wash day, (2) eliminate it as such, or (3) remove the discomforts of an inadequate laundry room.

It was interesting to note that washing machines just contribute to a pleasant wash day. They do not make it. All types of electric appliances can help. Here is a list of "laundry" equipment you may not have known about.

Clothes washer	Water softener
Dryer	Toaster
Ironer	Waffle baker
Steam iron	Timer
Hand iron	Automatic clock
Water pump	Freezer
Water heater	Refrigerator
Fan	Heating cable
Radio	Space heater
Range	Mixer
Vacuum cleaner	Casserole
Oil furnace	Stoker

Clothes Washing Is Now Incidental

Mrs. **Theodore F. Buhrman**
Route 1, Smithsburg, Maryland

For me washday recalls all the haunting memories of my childhood. At eleven years I stood over the old style heavy wooden tubs placed on a bench under the huge oak tree that stood above our spring. I scrubbed and rubbed away at a laundry for five brothers and sisters, my sick mother, my father, and myself. The tubs were filled with water dipped from the spring and heated in an iron kettle hung over an outdoor fire. I can remember having my 9-year-old sister hold one end of a pair of overalls or a sheet while I twisted mightily to extract the water before hanging the clothes up to dry. And of course we ironed with heavy sad irons (so well named), heated over a roaring wood fire in the big black kitchen range, even when it was 100° in the shade.

What an ordeal doing the laundry was then compared to the way I breeze through it now. Then washdays were washdays *only*. Neither time nor strength was left for anything else. Today I wash for a family of five and only spend about two hours at the job.

For me washday comes any day, any hour. Since I have a small laundry room with built-in tubs adjacent to the kitchen, I can begin my wash at any hour and prepare my meals, do dishes, can, bake, and even sew, if need be, while the clothes wash.

I fill my washer with water which has been pumped by an automatic electric pump from the spring some 500 feet from the house, and heated by an automatic electric water heater. I use a short length of ordinary garden hose to run the hot water directly from the laundry tub faucet into the washer. This saves lifting and, coupled with the pump which empties the washer, eliminates much of the labor of washday.

My washer has no timer attached and none is needed. With my laundry room so near my kitchen, I simply use the timer on my electric range to remind me when a load is done. The electric clock directly opposite the kitchen-laundry room doorway is always visible from the washer and keeps me posted, at

Mrs. Jimmie Oliver, R. 2, Stuttgart, Arkansas, is the mother of two pre-school children and the wife of a rice farmer. She and her husband have counted 28 uses they make of electricity in their home, not including the many shop tools and motors which Jimmie uses in the farm machine shop. Mrs. Oliver likes the automatic clothes drier because of the ease with which it can be used. She has it right next to her automatic washer and doesn't have to go outside the wash house from start to finish. Mrs. Oliver says, "I carry the soiled clothes out to the wash house and I bring back the clean, dry ones when I return. The drier makes the clothes fluffy and soft." She particularly likes the way it turns out terry towels and wash cloths, very soft and just like new.

a glance, on the time of day.

My kitchen radio on more than one occasion has warned me not to hang my clothes out to dry. Since I am fortunate enough to have an indoor drying area, the weather report at such a time saves a lot of unnecessary work. Favorite programs on the radio help break the routine of washday—another advantage of having a radio handy.

Especially in the summer when there is so much to be done, I have washed at night—thanks to the electric lights. I have one directly over my washer and a floodlight in the yard area where I hang my clothes. With the floodlight, either hanging or removing clothes late in the evening is as simple as in bright daylight.

A busy farm wife and mother can really enjoy washing clothes since electricity has taken the drudgery out of it. And my husband has just informed me that one of the next electrical servants he is going to buy is a clothes dryer. I'm eagerly awaiting that day, but I constantly thank electricity that my washdays of two decades ago are only a memory.

Lady "Hired Man" Pays for Appliances

By **MRS. M. E. BLISS**
Route 3, Merrill, Wisconsin

The elimination of any particular "wash-day" has been brought about through our use of modern electric appliances.

Ours is a farm with about 120 acres of alfalfa hay to be harvested each summer. Usually three high school boys spend a month with us helping with our hay crop.

What a busy month that is! Yet it is the month I like best in the whole year. My electric servants make it possible for me to be out-of-doors most of the day getting valuable exercise and perspiring freely in the health-giving sunlight.

By 10 a.m. I am ready to start out driving the jeep on the hay rake. The daily wash is already dry and taken from the line. With five daily shower baths and complete changes of clothing dripping with perspiration, and with frequent fresh bed sheets, there is a good-sized load of clothes to be washed daily. Damp clothes and those soaked with perspiration are not desirable to have lying around the house.

The automatic washer standing outside the kitchen door in the utility room washes the clothes as I make and serve breakfast. There is always plenty of hot water from the automatic electric water heater. The washer washes, rinses and spins the clothes so that they can be dried in less than an hour. Some can even be ironed damp as they come from the washer. It is a wonderful servant and one which I would dislike being without.

Two other "servants" make it possible for me to remain in the fields until time to serve lunch. The home freezer provides the fresh homemade whole wheat bread and the luncheon casserole. I put the latter in the oven before 10 a.m. with the automatic timer and thermostat set to heat it through. The dinner roast taken from the freezer is thawing and will be put in the oven along with the potatoes as soon as lunch is served. The automatic timer will again be set so the current will go on in time to cook by the dinner hour. With five speeds on the top units it takes only a few minutes to make the gravy and cook the vegetables.

My husband tells me I am his

Refrigerated Meat Time-Table

Meats are perishable foods. Stored too long in the refrigerator, they lose their full flavor and goodness. This is true of smoked meats such as bacon and sausage, as well as fresh meats. Therefore, in homes without freezers it is best to buy meat more often and in smaller amounts, so it can be cooked and enjoyed by your family while at its best.

Here is a guide to the length of time various meats can be kept in the refrigerator.*

Although the modern refrigerator makes the storage of perishable foods simple, safe, and easy, its contents should be used within a reasonable length of time.

Meat	*Days*
Beef	
Standing Rib Roast	5-8
Round Steak	3-5
Hamburger (not frozen)	2
Liver (sliced)	2-3
Pork	
Loin Chops	3
Pork Sausage (links in cello bag)	3
Lamb	
Loin Chops	5-6
Leg Roast	6-7
Hearts	2
Veal	
Loin Chops	5-6
Liver (sliced)	2-3
Sweetbreads	2-3

Meat	*Days*
Cured Meats	
Sliced Bacon	7
Ham (halves)	7
Picnic (whole)	10
Sliced Dried Beef	12
Table-Ready Meats	
Frankforts	4-6
Bologna, Baked Loaves, Luncheon Meats	4-6
Braunschweiger Liver Sausage (uncut)	4-6
Dry Sausage and Semidry Items (uncut)	2-3 weeks

*Based on storage in a household refrigerator at 36-38°.

RATE YOUR RANGE...

HOW CLOSE DOES IT COME TO Perfection

Here's your opportunity to rate your present or your future electric range! Check this list of important features — see how close the range you have in mind comes to *Perfection*! (Score sheets for gas and oil ranges appear in other advertising or can be obtained by writing.)

HEATING UNITS:	PERFECTION	OTHER RANGE
• Seven different heating speeds	☑	☐
• A new Hi-Power heating unit—gets hotter faster —for extra cooking heat	☑	☐
• Certain speeds heat only inside coils, preventing heat from escaping around small utensils	☑	☐
• An extra-large heating unit for frying pans, kettles	☑	☐
• Each unit has only **one** simple knob control for all speeds	☑	☐
• Control knobs at back of range—out of children's reach	☑	☐
• A deep-well equipped with a rack and pudding pan	☑	☐
• Double duty deep-well heating unit—raises and lowers with cooker—clicks into place as fourth surface unit	☑	☐
• Lift-out reflector pans for dishpan cleaning	☑	☐
• Lift-out drip cups for dishpan cleaning	☑	☐
• Units clean themselves as you cook	☑	☐

SCORE: RATING: (count 3 points for each check mark)

OVEN:	PERFECTION	OTHER RANGE
• All-white titanium porcelain lining, looks clean and bright	☑	☐
• Bakes evenly on any rack position. No shifting	☑	☐
• Totally automatic. Oven can be turned on and off by clock controls	☑	☐
• Rounded corners for easy cleaning	☑	☐
• Non-tilt, safety-lock oven racks	☑	☐
• Removable rack-holders, leaving a smooth, easy-to-clean interior surface	☑	☐

themselves as you cook

SCORE: RATING: (count 3 points for each check mark)

100 ____ a perfect rating . . . means you own a Perfection . . . the only electric range with all the features!

70-99 ____ an average rating . . . with this range you do about as much work as the range. You're settling for less than Perfection!

40-69 ____ a below-average rating . . . you work much harder than the range. It's low in efficiency and conveniences — a far cry from Perfection!

10-39 ____ definitely under-average. You'd better look at a Perfection — today!

- Rounded corners for easy cleaning
- Non-slip, safety-lock oven racks
- Removable rack-holders, leaving a smooth, easy-to-clean interior surface
- Automatic and manual interior light control
- High-level broiler that's easily accessible
- Heavy insulation for comfort and economy

1951 Perfection Electric Range

	OTHER RANGE	PERFECTION
WARMING DRAWER:		
• Separate temperature-controlled heating unit—keeps food warm—won't crack dishes	☐	☑
• Large enough to hold **both** the dishes and food	☐	☑
• Sliding shelf to double usefulness	☐	☑
• High-level for easy access	☐	☑
• Rolls smoothly, easily on ball bearings	☐	☑
OTHER ADDED VALUES:		
• Divided top gives room for even largest utensils	☐	☑
• Specially designed adjustable lamp—raises to desired height—illuminates entire range surface	☐	☑
• Two storage drawers for utensils save steps	☐	☑
• Timer to remind when foods are cooked	☐	☑
• Convenient outlet for toaster, grill, etc.	☐	☑
• Timed outlet for coffee maker, etc.	☐	☑
• Convenient, easy-to-see clock	☐	☑
• Acid-scratch-stain resistant titanium porcelain all around	☐	☑

PERFECTION STOVE COMPANY 7252-A Platt Ave., Cleveland 4, Ohio

You can't beat *Perfection* Electric...Gas...Oil Ranges

best "hired man" and were it not for me he would have to hire additional help. At present wages for farm help we have figured that we pay for our appliances in a few short years.

As for me, these conveniences are what makes it fun to live in the country at any time. But they make haying time an especially thrilling time.

A Comfortable Laundry Room

By **MRS. HENRY JOSEPHS**
Box 22, Gardenville, Penna.

Electricity helps me through my washday by making my laundry room warm and comfortable. My makeshift laundry room was mighty drafty and uncomfortably damp. I found I could make it warm and livable by installing an automatically controlled space heater. Of course, my husband and I first insulated the laundry so that we could get greatest efficiency and economy of operation from our electric heater. We find electric heat is economical because it supplies only the heat needed in the places where it is required.

For example, we extended electric heating to the water system, which generally gave trouble in cold weather. One of the best protections against a frozen water system is low-temperature heating cable controlled by a thermostat set to go on when the mercury drops to below 35 degrees. Only a small amount of electricity is used, but it is enough to insure a frost-free water system in freezing weather. Low-temperature heating cables protect our water pump, exposed water lines and valves. A heat lamp, directed at the floor around the bottom of my washer keeps my busy feet comfortable. And lately my considerate husband buried a piece of heating cable under the concrete steps leading to my laundry. By keeping the ice melted away, this prevents the possibility of a nasty fall when I'm carrying my clothes hampers in and out.

I find electric heating is extremely practical because it is safe, requires no flues, grates or chimneys, and, best of all, requires no attention.

According to the USDA, we Americans consumed 10,642,000 bushel of pickles during the year ending September 30, 1950.

Different Fabrics—Different Heat

Although some garments come from the store with laundering instructions attached, there are many that do not carry this information. To help with these clothes, and as a guide to ironing problems in general, here are suggestions for ironing various fabrics.

COTTONS: Light colored cottons should be ironed right side out; dark colors should be ironed on the wrong side to prevent a shine. Smooth, sheer cottons (voile, for example) should be ironed while quite damp; they can be ironed immediately after they have been removed from the automatic washer. Heavier cotton like shirting and gingham may be ironed from a quite moist to a slightly damp stage, depending upon the iron or ironer being used. When a flatplate ironer is used, all materials should be damper than when a rotary ironer or hand iron is used.

The best ironing temperature

For Smooth, Quiet, Dependable Power on Your Hay Drier, Be Sure You Get a Century Motor

For every hay drier installation—no matter what kind of blower, or how much power you need, there is a Century motor to do the job. The right size and type of Century motor will give you long service, unusually free from trouble.

For hay drying—or any other farm power job, use dependable Century motors.

Century Electric Company is celebrating its 50th Year in the electrical industry.

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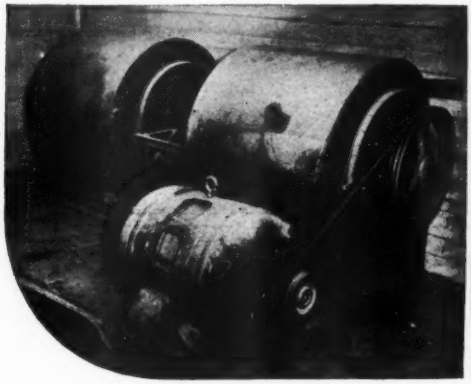


Century 7½ horsepower motor driving blowers for a hay drier. An open motor is suitable outside the mow dust area; otherwise, use a totally enclosed motor.

BARN DRIED HAY:

Digestible protein content of barn cured hay 18 to 24%—nearly twice field cured. Initial cost of drier installation 30c to 40c sq. ft. of mow floor. (Virginia Agr. Service.)

Electricity cost 75c to $1.50 a ton of hay dried. 7 to 18 days to dry hay depending on the weather. Hay can be put in the barn 5 or 6 hours after cutting. More leaves saved. (From Rural Electric Missouri, Dec. 1950.)

for cottons is between 350 and 400 degrees. Too hot an iron may permanently weaken cotton, even though no scorch is noticeable.

LINEN: Linens should be ironed when very damp—light colored right side out, and dark colored wrong side out. Rough, dull surfaces should be pressed on the wrong side; shiny surfaces such as table linens, on the right side. Avoid creasing table linens more than necessary and change the position of the crease frequently to avoid excessive wear. Linen may be ironed on an iron's "hot" setting, between 400 and 450 degrees.

RAYONS: Most rayons should be ironed on the wrong side when dry, or almost dry. There are exceptions, however. Spun rayon of the viscose variety should be ironed when only slightly damp, and acetate rayons (flat-backed satins, taffeta, sharkskin, ninons, spun and so forth) should be done while very wet. If these fabrics are dried and then sprinkled, they will come out badly spotted. It's best to just pat out the excess moisture between the folds of a towel after washing and iron immediately.

Ironing temperatures for rayons vary with the type of rayon. Usually the low temperatures—225 to 300 degrees—are satisfactory. Too warm an iron will glaze acetate rayons, and extreme care must be used when pressing a dry garment of this material. Always iron on the wrong side.

SILKS: Smooth-surfaced silks such as flat crepes and satins should be pressed while slightly damp; they should never be sprinkled. Rough surfaced silks such as shantungs and pongees should be ironed when dry; otherwise they will become stiff and shiny. Too warm an iron will yellow silks.

WOOL AND ARALACS: Garments of these materials should be pressed and not ironed. The garment should be dry and a lightly dampened pressing cloth should be used. Too much moisture and prolonged pressure will cause excessive shrinkage and matting.

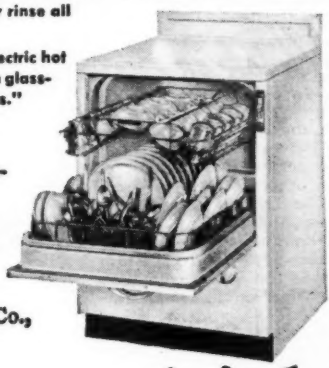
NYLON: Nylon needs little or

We're Being Talked About . . .

Listen in on *KitchenAid* owners and you'll hear statements such as, "Does everything the manufacturer claims" . . . "Washes, dries far better than I ever could by hand" . . . "We're really proud of our *KitchenAid*." Users have said just that!

We've studied the user reports and believe these facts will interest you. *KitchenAid* owners report:

1. **The front-opening door and two sliding racks assure easiest tableware loading.**
2. **The Hobart revolving wash principle provides complete washing action.**
3. **The two power rinses effectively rinse all tableware.**
4. ***Separately powered,* circulated, electric hot air drying is so effective that even glassware is dried without "tear drops."**
5. ***KitchenAid* is self-cleaning and sanitary.**
6. ***KitchenAid* is remarkably trouble-free.**



For informative *KitchenAid* dishwasher literature, write *KitchenAid* Home Dishwasher Division of The Hobart Manufacturing Co., Dept. KE, Troy, Ohio.

KitchenAid

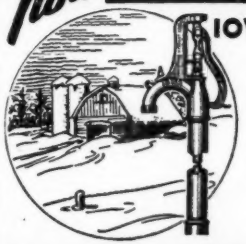
TRADE MARK

The Finest Made by Hobart

World's Largest Manufacturer of Food and Kitchen Machines

Now YEAR 'ROUND OUTSIDE WATER SERVICE

IOWA **FREEZELESS** HYDRANTS



Have running water to your stock tank all year 'round . . . just raise the handle on the Woodford Iowa Freezeless Hydrant . . . and save time, work, MONEY:

- "Positive" lock lever cuts off water below frost line.
- Automatically drains hydrant case each time.
- Economical—simple, sturdy construction; fewer wearing parts; low upkeep.

Easy to install on ANY farm water system. Ask your local dealer NOW or write today for free circular.

WOODFORD HYDRANT CO., Des Moines 17, Iowa

$15.95 BUYS THE ELECTRIC SHAVER THAT CONVINCED BARBERS

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COSTS LESS YET DOES MORE!

Take the word of leading barbers—*WhiskER'S* new thin (.002") clipper blade cuts 1 to 7 day beards (even those other shavers will not touch) clean and close. Operates quietly on 110 v., 60 cycle AC; no TV or radio interference! Fast — 14,400 shaving strokes per minute! Women like *WhiskER* for safely removing superfluous hair on legs and under arms. Get *WhiskER* at your Barber or Dealer.

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☐ Encl. find $15.95 (check, money order).
☐ Encl. find $5. Send *WhiskER* C.O.D. I'll pay postman balance plus postage.

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Shock-Cool your milk minutes after milking with the new Aeroflow DRY COLD Milk Cooler. Checks bacteria growth instantly! Filters, aerates, shock-cools, stores in one operation. No Water! No lifting!

Write for new folder. Dealership now available.

STAR PUMP & COOLER CORP.

Manufacturers of Farm Equipment 57 Years

1224 No. Fifteenth St. • St. Louis 6, Mo.

no ironing. If the fabric contains 60 per cent or more nylon combined with some other fiber, the material requires only one pressing to set the weave. Thereafter ironing is not required, even after washing. Ironing temperatures up to 385 degrees may be used safely.

OTHER FABRICS: Corduroys, chenilles, vinyons and fiber glass require no ironing. Proper care when drying knitted garments makes their ironing unnecessary. Hand or machine-lacquered prints, however, should always be ironed on the wrong side.

EMBROIDERIES AND LACES: These materials should be ironed on the wrong side to bring out the pattern. Cotton laces should be ironed when dry.

Regardless of the type of equipment you are using, always iron with the grain of the fabric and never pull the garment. When space permits, ironed blouses, dresses and the like should be kept on hangers.

Rayon Pile is Easily Sewn

By **MRS. M. BALDWIN**
Butte, Montana

When we remodeled our home two years ago we put in two large picture windows in one corner of the living room. One faces east and the other south. That is where I put my sewing machine. With a table nearby for cutting out patterns and measuring, and electric outlets to connect my machine and electric iron I find it very handy. I also have a floor lamp close by to use when I sew in the evenings.

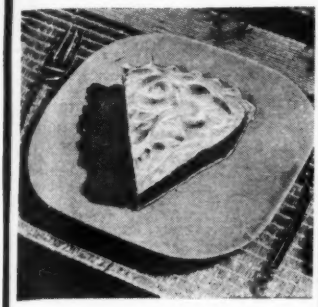
My machine is an old treadle machine recently converted to electricity with an electric motor. My husband keeps it repaired and adjusted, so it sews just as good as new.

I make play suits and shirts and I've even made a coat and hat set for my 2-year-old boy. I made my daughter's winter coat of rayon pile and it sewed beautifully; just a push of a button. I make aprons, dish towels, and pillow slips, pot holders, patches for overalls, leather mittens, hems in canvas for my husband, and plastic curtains for my windows. If the plastic doesn't feed through under the presser foot, I lay a strip of newspaper under the seam and sew it right along with the plastic. Then I simply rip off the newspaper and leave the seam intact.

Mrs. Baldwin says "My 5-year-old daughter sews doll clothes sometimes. The electric machine is so easy to operate she does just fine."

Sour Cream Pecan Pie

This month with eggs more plentiful than fruit, it's a good time to try a new one-crust pie. The mixture is easy to put



together and your dependable electric range does the rest to make it a real treat.

Sour Cream Pecan Pie
1 unbaked 8-inch pie shell
3 eggs, separated
¾ cup sugar
1 tablespoon cornstarch
⅛ teaspoon salt
½ cup chopped pecans
1 tablespoon coconut
1 cup sour cream
⅛ teaspoon salt
¼ teaspoon cream of tartar
6 tablespoons sugar

Beat egg yolks well. Combine sugar, cornstarch and salt; add to egg yolks, mixing well. Stir in chopped pecans and coconut. Add sour cream; blend thoroughly. Pour into unbaked pie shell and bake in moderate oven (350° f.) 50 minutes or until filling has browned and is set. Remove from oven. Reduce heat to 325° f. Beat egg whites until frothy. Add salt and cream of tartar and continue beating until almost stiff enough to peak. Add sugar gradually, beating until stiff but not dry. Pile lightly on filling. Bake in slow oven (325° f.) 15 minutes or until lightly browned. Cool and serve.

Liver and Onions

Coax the family to eat its share of nutritious liver often. Here liver is cooked to tenderness in a rich cream sauce, and served with sliced mushrooms and onions for a dressed up version of just plain Liver and Onions.

Liver is one of the easiest meats to prepare. To cook, dip liver slices in seasoned flour and brown the meat slowly in 2

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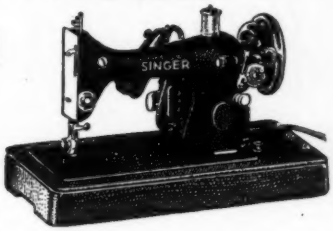

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tablespoons of hot fat in a heavy skillet. Turn the meat with tongs for even browning and add ¾ cup cream, 1 cup sliced onions and 1 to 2 cups diced fresh or canned mushrooms.

Add a crushed bay leaf for flavor, cover and cook liver slowly over low heat for 30 minutes, or until the meat is fork-tender. Serve hot with fluffy mashed potatoes, buttered green peas and individual fruit salads that make that once-a-week liver service a real treat.

How to Power Mix a Good Cake

Say what you will about grandmother's melt-in-the-mouth cake—it couldn't hold a candle to the cake the average homemaker can make today with her electric mixer.

Electric mixing produces better results in a shorter time, with less effort, because it coats each granule of sugar with a thin layer of fat. This may not mean much to most homemakers; but it does add up to a cake that not only has more even texture than the old hand-mixed cake, but is also finer grained and more tender.

The conventional method of mixing a cake is to blend the shortening and vanilla, gradually adding the sugar while the mixer is working for you. Then the eggs (part or whole) are added and the dry ingredients are put in alternately with the milk. The mixer still whirs on, making short order of a once tedious process.

When you try the following cake recipes, keep one thing in mind: be careful not to overbeat the batter after the flour and liquid have been added. Your mixer is so much more efficient than hand beating that only a fraction of the time is required.

Cranapple Upside Down Cake

½ cup firmly packed brown sugar
3 slices pineapple (No. 2 can)
1 cup cranberry sauce
1¼ cups sifted cake flour
1½ teaspoons baking powder
½ teaspoon salt
⅓ cup shortening
1 teaspoon vanilla
½ cup sugar
1 egg
½ cup milk

Sprinkle brown sugar in bottom of well greased 8 x 8 x 2 inch pan. Cut pineapple in ½-inch pieces; arrange on brown sugar. Put cranberry sauce evenly on pineapple. Sift together flour, baking powder and salt. Blend together shortening and vanilla. Gradually add sugar, creaming until light and fluffy. Add egg; beat well. Add dry ingredients alternately with milk, beginning and ending with dry ingredients. Pour over cranberry mixture. Bake in a moderate oven (350°) 55 to 60 minutes. Remove from oven; invert pan on a cake cooling rack. Let stand 5 minutes; lift off pan.

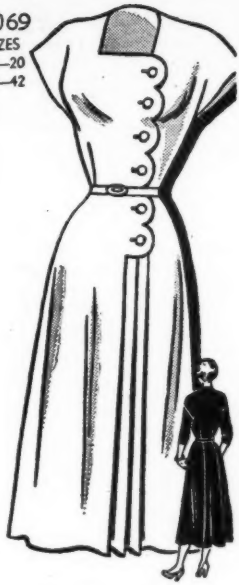
"I don't know much about them except which instruction to ignore to make it cost $4.98 for repairs."

Spice Cake with Nut Topping

2½ cups sifted cake flour
¼ teaspoon cloves
¼ teaspoon nutmeg
¼ teaspoon mace
1 teaspoon cinnamon
1 teaspoon allspice
2 teaspoons baking powder
½ teaspoon baking soda
½ teaspoon salt
1 cup firmly packed brown sugar
½ cup shortening
2 eggs
1 cup thick sour milk or buttermilk
3 tablespoons granulated sugar
½ cup chopped walnuts

Sift together flour, spices, baking powder, baking soda and salt. Gradually add brown sugar to shortening, creaming until light and fluffy. Add eggs one at a time, beating well after each addition. Add dry ingredients alternately with milk, beginning and ending with dry ingredients. Pour into greased 9 x 9 x 2 inch pan. Mix granulated sugar and walnuts. Sprinkle on batter. Bake in moderate oven (350°) 50 to 60 minutes.

It's easy to make an everyday menu seem extra good—just serve it with flaky hot biscuits. Cherry rolls are good. Simply spread cherry preserves over rolled-out biscuit dough, roll up like jelly roll and cut into slices. Place cherry slices cut side down in greased muffin pans, then put one-half teaspoon of preserves on top of each roll. Bake in a hot oven (450°) 12 to 15 minutes. Cherry rolls will delight the



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youngsters any day. They make an attractive supper bread the year round, going especially well with eggs, ham, and salads.

If the cookie box is empty, you can dress up bread in a hurry to serve as accompaniment to prune whip or fruit sauces. Butterscotch toast is rich-tasting; make it by spreading toasted bread with butter, then sprinkling with brown sugar. Pop it under the broiling unit until the mixture bubbles. Or make fragrant cinnamon toast, excellent as dessert bread. Orange juice and rind may be mixed with granulated sugar and spread over buttered toast for another flavorful topping.

When you take freshly baked bread or rolls from the oven, take them out of the pans at once. This keeps moisture from condensing and spoiling the crispness of the crust. Set loaves of bread on cooling rack or across the edges of the baking pans to cool. Be careful not to place them in a cold draft, as cold air blowing over hot loaves causes the crust to crack. If you like, brush the tops of the loaves and rolls with fat to help keep them from becoming dry.

New Publications

These publications are not distributed by our magazine. Write directly to addresses given.

• THE PRACTICAL BOOK OF FOOD SHOPPING. By Helen Stone Hovey and Kay Reynolds. J. B. Lippincott Co., E. Washington Square, Philadelphia 5, Pa. $3.45. A complete guide to the selection of better, more nutritious food, written in everyday terms to meet the everyday problems of food shopping. There are interesting facts about food, tips on how to select a store, quality and storage secrets, and a host of money saving helps.

• PROCEDURES FOR HOME FREEZING OF VEGETABLES, FRUITS AND PREPARED FOODS. By Elsie H. Dawson, Gladys L. Gilpin, and Howard Reynolds. Agriculture Handbook No. 2, 106 pp, 40c. U. S. Government Printing Office, Washington 25, D. C. What research workers have found about home freezing methods is listed, food by food. The best home freezing method is listed in one column, with others in a second column.

FARM MOTHER STRICKEN WITH UNDULANT FEVER

Hospitalized three times within year

"I am lying in bed writing this letter—just arrived home after my third stay in the hospital in less than a year due to Undulant Fever. It is a terrible disease, causing pain and discomfort, weakness, nervousness and depression. My two small children don't know what it means to have a mother that is well and able to do for them. My advice to all farmers is—pasteurize your milk before you become a victim."

(Signed) Mrs. Robert I. Smith

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Hi!

Captain Kidd! Pieces of eight —buried treasure—romance! Ah —that's good in books. Dad and I've got to fit the lower meadow this spring. Been spreading manure all winter, and now it's plow, harrow, and sow. Buried treasure—that's for kids! But is it? What is treasure?

Webster tells us that it is "an accumulation of valuables, such as money or jewels; abundance or wealth; a hoard or store."

The wealth of a farm lies in the soil. It is buried treasure. No need to sail the "Spanish Main!"

Each year, as spring rolls 'round, a veritable treasure is buried in the earth. Even as Captain Kidd, we know that the earth will bring forth everything entrusted therein. Across the farms of the nation men are putting forth their faith in buried treasure. Yes, storm signals are flying; the glamour of the "Jolly Roger" is missing; but treasure is still being buried.

There is very little glamour to life, even that of the other fellow whom we envy! But there is ample treasure for you who will dig for it. There is even more for you who will plant a little!

The faith of your fathers speaks from the earth. Look not far afield for romance. It lies at home at your feet.

Kenneth V Andrews

Electric Controls and Their Application

How Thermostatic and Pressure Switches Operate

By **PROF. D. C. SPRAGUE**
Pennsylvania State College

Two types of electrical controls most commonly found on farms are thermostatic switches and pressure control switches. They are used to control automatic equipment by the action of the surrounding temperature or pressure. The actual switch which opens or closes the electric circuit may be the same in each of these controls. The difference lies in the way that the switch is operated.

Materials expand when they become warm and contract when they become cold. All materials do not expand or contract at the same rate. Some react much faster than others, and to a greater extent. It is this expansion and contraction of materials that is used to operate thermostatic switches.

You have probably seen the thermostat which is used to control the temperature within a chick brooder. Figure 1 shows this type of thermostat. The wafer in this thermostat actually operates the switch. It is partially filled with a liquid which vaporizes as it gets warmer. The vapor requires more room and exerts pressure within the wafer. This makes it thicker, and the wafer presses against the switch button. Then as the temperature of the wafer is lowered, the vapor condenses, turning back to liquid which takes less room and reduces the pressure within the wafer. This allows it to shrink back removing pressure from the switch button.

A pressure operated switch is shown in Figure 2. This is the type that is commonly used to operate the pump in an automatic water system. As water is pumped into the pressure tank of the system, the air in the top of the tank is compressed. This compressed air is led through the pressure tube to the bellows of the pressure switch. As the pressure increases, the bellows expand. When they do this, a finger contacts the button on the switch, opening the circuit and stopping the pump from operating. As you draw water from your system, the pressure reduces and the spring pushes the bellows back to the normal position. The switch button is released so that the pump starts again.

You will note that in both of these controls, the switch is merely a means of opening or closing the electric circuit. The action of the temperature or pressure is just that of operating the switch.

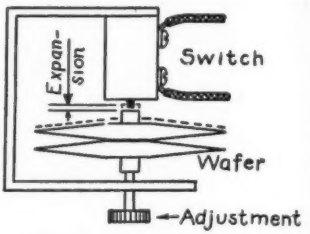

Figure 1. Schematic drawing of a wafer thermostat. Each cell of the wafer is partially filled with alcohol or other liquid which vaporizes at a relatively low temperature. When the wafer is warmed by surrounding air more of this liquid vaporizes causing the wafer to swell or expand (indicated by dotted line). Upon being cooled some of the vapor condenses causing the wafer to contract. Thus the wafer becomes thicker when warmed and thinner when cooled. As it changes thickness it moves a pin which opens or closes a switch. Wafer type thermostats are commonly used on brooders. Adjustment, within the expansion range of the wafer, is made by turning the adjustment screw. This increases, or decreases, the amount the wafer must expand before it operates the switch. Different wafers may be used for different temperature ranges. When not in use, the wafers should be stored in a place of uniform temperature, such as a cellar. Storage in hot attics, or where the sun can strike them, will shorten their life. The extremely high temperatures cause the wafers to over-expand and develop leaks.

Another type of thermostatic switch commonly used employs what is called a bi-metallic strip. This is made up of two different types of metal bonded together. Each of the two metals has a different rate of expansion, one being much faster than the other. Now let us assume that we heat this bi-metallic strip. The metal is going to expand,

one kind much faster than the other. This means that one piece will become longer than the other. But they are bonded together. The only way for one to be longer than the other is for it to form the outer part of a circle. And that is just what happens. The bi-metallic strip curls up separating the two electrical contact points. A very simple switch of this nature is shown in Figure 3.

The mechanism used in the pressure switch, Figure 2, is also employed in a third type of thermostatic switch. The difference lies in the fact that the pressure tube is connected to a sealed bulb which contains a liquid such as mercury, which has a high rate of expansion and contraction. As the mercury expands, the pressure is conveyed to the bellows which expands them and operates the switch. Themostats of this nature are used in household refrigerators.

With thermostatic switches, the expanding member, either bi-metallic strip, wafer, or sensitive bulb, is placed in the material whose temperature is to be controlled. Different types of units are available for use with liquid, or for use in air. They may be obtained to either open or close the electrical circuit as the temperature rises.

Remember that whenever you use a thermostatic or a pressure switch, you should observe the same practices as with any other electric switch. Install it in the hot leg of the circuit so that the ground leg is uninterrupted.

If you would like a good project, check over the different equipment on your farm which is controlled by a pressure switch or by a thermostatic switch. You will find them controlling brooders, incubators, irons, ranges, refrigerators, ventilating systems, water systems, furnaces, hot beds, freezers, milk coolers, etc. Make your list. See if you can determine type for switch used in each case.

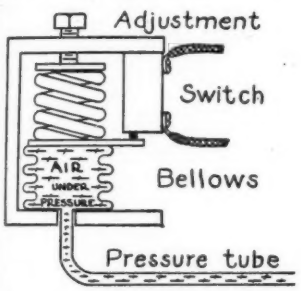

Figure 2—Schematic drawing of a pressure switch like that used to automatically start and stop a water system motor. The metal bellows which causes the switch to open and close is connected by a tube to the pressure tank. When the pressure in the tank increases, the change in pressure is transferred through the tube to the bellows. This causes the bellows to expand and compress the spring. An arm mounted between the bellows and the spring contacts a pin which opens the switch when the pressure is increased. When the pressure decreases the spring forces the bellows to contract. Then the arm moves away from the pin and allows the switch to again close. The switch is made to open at a higher pressure by forcing the spring more tightly against the bellows. This is done with the adjusting screw. Switches of this type are used for controlling vacuum (negative pressure) as well as pressure.

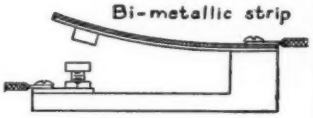

Figure 3—Schematic drawing of a bimetallic thermostat with open contact points. It consists of a bimetallic finger, contact points, and an insulating base. The bimetallic strip is made of two dissimilar metals bonded together. The bottom strip of metal expands more than the upper one when it is heated. This causes the finger to bend upward when it is heated, thus opening the switch points as shown in this sketch. The temperature at which the points will open or close may be adjusted by screwing the bottom contact point up or down. Bimetallic thermostats such as this one are used to control low wattage equipment such as furnace damper motors. If the thermostat is to handle equipment with heavier current demands, the bimetallic strip would be used to operate a heavier, snap-action switch.

5-K Clubs in Turkey

A report from Turkey says that plans for organizing 5-K clubs, similar to our 4-H clubs, are being made.

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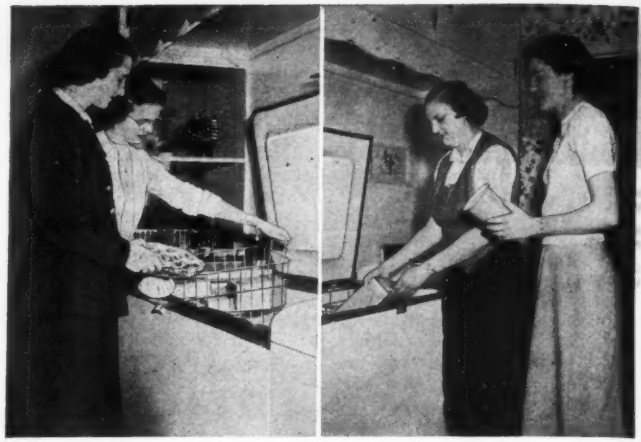

The National 4-H frozen foods champions for 1950 did a little sight-seeing during their stay in Chicago. Here they are inspecting the freezers and contents on display at the Museum of Science and Industry. Reading from left to right, they are Eleanor Reid, Barbara Bonham, Elva Dedert, and Dorothy Ann Dalrymple.

Frozen Foods Champions

Does freezing food at home pay? It certainly does, says Elva M. Dedert, 17-year-old 4-H girl from Ursa, Illinois. She estimates that she saved $410 last year on her family's food bill by freezing. "Frozen food has a fresher flavor than canned food," she says, "and it's much simpler to prepare."

Elva is one of four national 4-H frozen foods champions who were honored at the National 4-H Congress in Chicago last November. The others were Eleanor Reid, 16, of Richburg, South Carolina; Dorothy Ann Dalrymple, 18, of Neshanic Station, New Jersey; and Barbara Bonham, 15, of Albuquerque, New Mexico. As winners in the frozen foods competition, they were each awarded a $300 scholarship and an all-expense trip to the National Congress by International Harvester.

Eleanor Reid has frozen 2,850 pounds of meat and 3,552 quarts of fruits and vegetables from her own garden in the last five years. She worked out a schedule so there would never be too much of one food in the freezer. She says she finds strawberries, peaches and okra especially good, and is experimenting with freezing cantaloupe.

"Freezing is faster and foods taste better frozen," says Dorothy Ann Dalrymple. She has frozen $440 worth of food at an estimated saving of $300 in the three years she has worked on the frozen foods project. One of the special delights of freezing food, Dorothy Ann thinks, is having fresh frozen corn on the cob at Christmas time.

Barbara Bonham likes to plan complete menus around frozen foods. One of the best time-savers she has found is freezing sandwiches for school lunches. She also freezes rolls, bread pudding, cakes, rabbit, chop suey, and eggs, as well as fruits and vegetables. She won first and second places in frozen foods at the county fair, and first in the state of New Mexico.

Together, these four champions have frozen enough food to feed a small army. They have proved what a convenience and a money saver a home freezer can be when it is used to its greatest capacity.

Early attempts at quick freezing foods before 1930 centered on a few types of fish. Today more than two hundred varieties of food, including some completely prepared dishes, are marketed quick-frozen.

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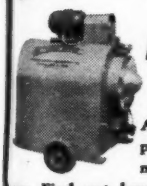

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Questions and Answers

Freezer Choice

▶**Question:** *I am thinking of buying a farm freezer and would like to know whether the upright or the chest type freezer is best. Some say that it costs more to operate an upright. If so, how much? How big a freezer do you recommend for a two family farm? What is is the best location for the freezer, in the basement or on the ground level?* J. M., Wisconsin

▶**Answer:** The choice between an upright and a horizontal freezer rests entirely with you. The operating costs are approximately the same for either type. The effect of door opening on the cost of operating the freezer is too frequently overemphasized. If one-half of the air in an 8 cubic foot freezer operated in a 70° room is replaced with warm air each time the door is opened, it would require more than 500 openings to use 1 kw-hr of electricity.

It is recommended that between 5 and 6 cu. ft. of storage space be allowed for each person served. The basement seems to be the most popular location for the freezer.

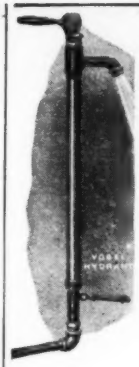
Pasteurizer-Homogenizer?

▶**Question:** *Is homogenizing equipment the same as pasteurizing equipment but with thermostats set for higher heat? If you know of anyone that makes this equipment in 20 or 25 gallon capacity would you please let me know? I would, also, like to hear what you have to say on this type of equipment.* R. E. F., Kentucky

▶**Answer:** The pasteurization and homogenization of milk are two separate processes. The same equipment will not do both jobs.

Pasteurization kills bacteria, found in milk, by the application of heat. It does not eliminate them all, but it does destroy the harmful ones. There are two processes. In one, the milk is heated to a temperature of approximately 160° and held there for 15 seconds. In the other, it is raised to the temperature of 143° and held there for a minimum of one-half hour.

Homogenizing equipment breaks up the fat globules in the milk reducing their size so that they are held in a continual state of suspen-



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sion. There is no cream line on homogenized milk because the fat does not rise to the top as is the case with milk which has not been homogenized. It also gives milk the so-called soft curd characteristic which makes it easier to digest. A homogenizer will improve the body and texture of cream that has been passed through it.

Homogenizing equipment is very similar to a pump. It forces the milk, under heavy pressure, through fine apertures. It is a continuous flow process and units are rated on the quantity of milk that can be passed through them over a given period of time.

Small Area Irrigation

▶**Question:** *Where can I get information on methods, details and equipment used for irrigation?*

I am trying to get accurate data to cover a project of three to six acres—or even smaller at the start. I do not know whether or not costs would be prohibitive or what methods would be best adapted for a small plot. I do know that irrigation in a specialized crop can make the difference between top production and flat failure.

Your suggestions will be appreciated. H. VonL., New York

▶**Answer:** Write to the manufacturers of irrigation equipment. Help may also be obtained from the rural representative of your Power Supplier and from the Extension Service at your State University.

There are many factors which will influence your choice of irrigation equipment. However, the water source will dictate certain requirements that cannot be avoided. This will influence the type of pump, the cost of pumping, and the choice of power source. If shallow lift water is available within reach of your electric service, a 2 hp unit, properly managed, could cover a project of three to six acres.

Plan on the use of low pressure sprinklers with two moves of the pipe in 24 hours. This would allow a small size pump, operating 24 hours a day, to give coverage which might be expected from larger pumps.

Electric Lawn Mowers

▶**Question:** *I have been thinking of buying a power lawn power. As I have had some unpleasant experiences with small air cooled gasoline motors, I would like to purchase an electric driven mower. However, I do not see any around our section. Is it because there are to many "bugs" in them? Just how dangerous are they? Can a person suffer a bad shock while working with them? What are the disadvantages?* P. F., Pennsylvania

▶**Answer:** Perhaps the reason that you do not see many electric mowers in your area is because they have not been merchandised as extensively as have the gasoline driven mowers. There are no "bugs" in them. They are a good piece of equipment and they are very simple to operate. They are no more dangerous to use than a vacuum cleaner. If the equipment is kept in good condition, there is no danger of shock.

The only limitation placed on the use of an electric lawn mower is the limitation of the cord. Some of the mowers come equipped with automatic reels which take up the cord or let it out as required. With a little practice, the cord is no problem even without the reel.

The USDA says farm production has increased 20 percent since '41, thanks to mechanization. The labor force has dwindled, during the same period by about a million workers.

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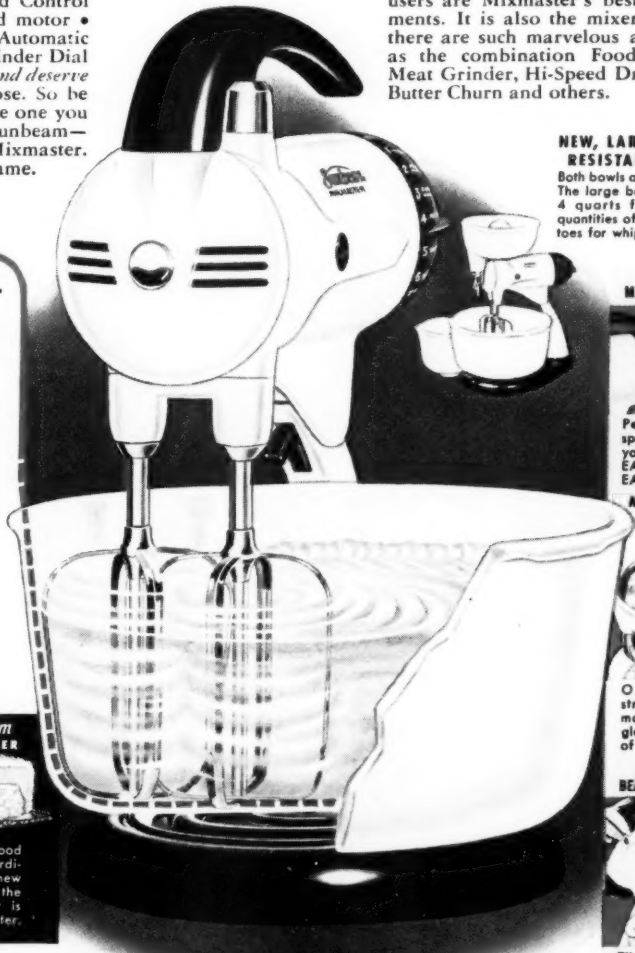

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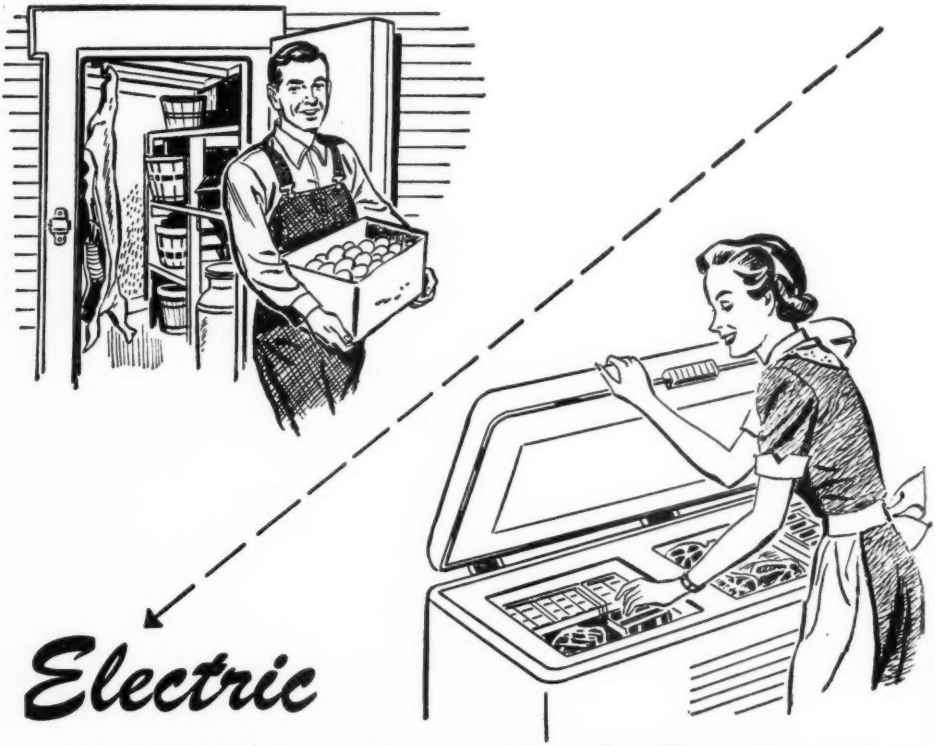

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